

**Course Name:** Maritime and Offshore Safety Analysis

**Number of credits:** 5 ECTS

**Period:** January/July Semester

Program Coordinator	Ms. Rasidah Shafiee
Credits	5 ECTS
Lecturers	
Level	Bachelor
Host institution	Universiti Kuala Lumpur – Malaysian Institute of Marine Engineering Technology (UniKL-MIMET)
Course duration	17 weeks
New/revised	New

### Summary

This course is offered as an elective subject to the Bachelor of Maritime Operations (BMO) programme to expose students to the knowledge of maritime and offshore safety. Its related to conventions and regulations, factors contributing to maritime accidents and their related risks.

### Target student audiences

Bachelor students majoring in maritime operations, marine electrical and electronics and naval architecture.  
 Year 3, Semester 5

### Prerequisites

None.

### Aims and objectives.

The main course objective is to provide the students with a broader understanding on the safety aspect of maritime and offshore operation. It also exposes students to the various techniques in analyzing maritime risks and accidents.

### The Authentic Tasks are:

#### General learning outcomes:

By the end of the course, successful students:

- Knowledge - will be able to identify the concept of maritime and offshore risks including the main factors that contribute to accidents.
- Comprehensive - will be able to explain available conventions and regulations pertaining to maritime safety and maritime operation.
- Application - will be able to recommend the measures required in maritime emergency preparedness
- Analysis - will be able to differentiate between risk analysis and risk assessment.  
 - will be able to examine the various types of accident analysis and investigation models.

### Overview of sessions and teaching methods

Teaching and learning will be via blended learning involving lecture, interactive virtual classes through the use of online platform designed to support the implementation of an innovative interactive learning approach. The online platform (UniKL VLE and MS-TEAMS) will also serve as a virtual space for students to interact with each other. Collaborative learning and group discussions will also be done online. Students are required to do self-learning based on given topics in preparation for continuous assessments. Assessment will both formative and summative. Students will be assessed through quizzes, oral

presentation, written tests, individual and group assignments. Peer evaluation will be part of the assessment of a team work.

<b>Learning methods</b>	<ul style="list-style-type: none"> <li>- Online lectures and oral presentations</li> <li>- Individual/group assignments</li> <li>- Problem based learning</li> <li>- Moderated in-class discussions.</li> </ul>	
<b>Course outline</b>	Week 1-3	<ol style="list-style-type: none"> <li><b>1. SAFETY AND ECONOMY</b> <ol style="list-style-type: none"> <li>1.1 Maritime safety regime</li> <li>1.2 Why safety improvement is difficult?</li> <li>1.3 The risk concept</li> <li>1.4 Expertise and rationality</li> </ol> </li> <li><b>2. MARITIME RISK PICTURE</b> <ol style="list-style-type: none"> <li>2.1 Maritime activity</li> <li>2.2 Concept of accident types</li> <li>2.3 Qualitative risk picture</li> <li>2.4 Fatality risk</li> <li>2.5 Pollution</li> <li>2.6 Large scale accidents</li> <li>2.7 The accident phenomenon</li> </ol> </li> </ol>
	Week 4-5	<ol style="list-style-type: none"> <li><b>3. OFFSHORE SAFETY AND SURVIVAL</b> <ol style="list-style-type: none"> <li>3.1 Aim and objectives</li> <li>3.2 Helicopter operations</li> <li>3.3 General safety</li> <li>3.4 Working safety</li> <li>3.5 Fire-fighting</li> <li>3.6 Abandonment</li> <li>3.7 Cold water immersion and first aid</li> <li>3.8 Search and rescue</li> </ol> </li> <li><b>4. RULES AND REGULATION</b> <ol style="list-style-type: none"> <li>4.1 The structure of control</li> <li>4.2 The IMO conventions</li> <li>4.3 ISPS Code</li> <li>4.4 Coastal state enforcement</li> <li>4.5 Classification societies</li> </ol> </li> </ol>

	Week 6-8	<p><b>5. RISK ANALYSIS TECHNIQUES</b></p> <p>5.1 Risk analysis and risk assessment 5.2 Basic theory 5.3 Preliminary Hazard Analysis (PHA) 5.4 Hazard and Operability Studies (HAZOP) 5.5 Failure Mode, Effect and Criticality Analysis (FMECA) 5.6 Fault Tree Analysis (FTA) 5.7 Event Tree Analysis (ETA)</p> <p><b>6. COST BENEFIT ANALYSIS (CBA)</b></p> <p>6.1 Basic theory 6.2 CBA in a Risk Assessment context 6.3 Alternative problem solving approaches 6.4 CBA of oil spill prevention measures</p>
	Week 9-13	<p><b>7. FORMAL SAFETY ASSESSMENT (FSA)</b></p> <p>7.1 The FSA approach 7.2 Hazard identification 7.3 Risk assessment 7.4 Establish safety assessment 7.5 Cost benefit assessment 7.6 Recommendations for decision making 7.7 Application of the FSA methodology</p> <p><b>8. ACCIDENT ANALYSIS</b></p> <p>8.1 Safety and learning 8.2 The maritime system 8.3 Accident theories 8.4 The Loss Causation models 8.5 Alternative accident models 8.6 Accident analysis software 8.7 Human factors analysis 8.8 The CASMET approach 8.9 Case oriented analysis 8.10 Incident reporting</p>
	Week 14-16	<p><b>9. EMERGENCY PREPEREDNESS</b></p> <p>9.1 Example of maritime accidents 9.2 Emergency and lifesaving regulations 9.3 Emergency preparedness activities and functions 9.4 Human behavior in catastrophes 9.5 Evacuation simulation 9.6 Pollution emergency planning</p>
	Week 17	<b>PRESENTATION</b>

**Literature**  
Compulsory

1. Kristiansen, Sveln (2005), Maritime Transportation, Safety Management and Risk Analysis, Elsevier

Butterworth Heinemann, Oxford  
 2. Springett, Peter (1998), An introduction to Offshore Safety and Survival, Oilfield Publication Ltd.

### Recommended

1. National Research Council (1991), Crew Size and Maritime Safety, National Academy Press, USA.
2. Vinnem, Jan Erik & Hope, B. (1996), Offshore Safety Management Theoretical, Fundamental and Practical Experiences, Tapir

### **Course workload**

The table below summarizes course workload distribution:

<b>Activities</b>	<b>Learning outcomes</b>	<b>Assessment</b>	<b>Estimated workload (hours)</b>
<b>In-class activities (54 hours)</b>			
Lectures	Explain available conventions and regulations pertaining to marine safety in maritime operation.	Class participation.	37
Moderated in-class discussions	Identify the concept of maritime and offshore risks including the main factors that contribute to accidents.	Class participation and preparedness for discussions.	10
In-class assessments	Differentiate between risk analysis and risk management.	Written test and quizzes.	3
Individual assignments	Individual assignments in using various types of accident analysis and investigation models.	Individual assignments.	6
Group assignment	Recommend the measure required in maritime emergency preparedness.	Group assignment and presentation.	4
<b>Independent work (96 hours)</b>			
Working group:	- Contribution to group case studies projects - Contribute to the preparation and delivery of personalized presentations - Contribute to web application	Quality group exercises and individual presentations	25 hours
Self study		Self study and reading of learning materials	71 hours
<b>TOTAL</b>			<b>120</b>

### **Grading**

The students' performance will be based on the following:

<b>Assessment</b>	<p><u>Continuous assessment (60%):</u></p> <ul style="list-style-type: none"> <li>- Quizzes (10%): students have to undertake quizzes covering topics covered throughout the semester</li> <li>- Written Test (30%): students have to undertake written test covering topics covered throughout the semester.</li> <li>- Individual/Group Assignments (20%): students have to complete the practical tasks given for selected topics. The students will be divided into groups of 4-5 students and each group will be given a topics. Peer Assessment will constitute 5% of the group assignment.</li> </ul> <p><u>Final assessment (40%):</u></p> <ul style="list-style-type: none"> <li>- Written Exam (40%)</li> </ul>																																	
<b>Evaluation</b>	<table border="1"> <thead> <tr> <th>Mark</th> <th>Grade</th> <th>Point Value</th> </tr> </thead> <tbody> <tr> <td>80-100</td> <td>A</td> <td>4.00</td> </tr> <tr> <td>75-79</td> <td>A-</td> <td>3.67</td> </tr> <tr> <td>70-74</td> <td>B+</td> <td>3.33</td> </tr> <tr> <td>65-69</td> <td>B</td> <td>3.00</td> </tr> <tr> <td>60-64</td> <td>B-</td> <td>2.67</td> </tr> <tr> <td>55-59</td> <td>C+</td> <td>2.33</td> </tr> <tr> <td>50-54</td> <td>C</td> <td>2.00</td> </tr> <tr> <td>45-49</td> <td>C-</td> <td>1.67</td> </tr> <tr> <td>40-44</td> <td>D</td> <td>1.00</td> </tr> <tr> <td>0-39</td> <td>F</td> <td>0.00</td> </tr> </tbody> </table>	Mark	Grade	Point Value	80-100	A	4.00	75-79	A-	3.67	70-74	B+	3.33	65-69	B	3.00	60-64	B-	2.67	55-59	C+	2.33	50-54	C	2.00	45-49	C-	1.67	40-44	D	1.00	0-39	F	0.00
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