



Project. RELAR (REmote Learning and examination based on AR)

Grant Agreement n. 2020-1-NL01-KA226-VET-083043

Output 02 Task 1



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1. Expected Outcome of Output 02 Task 1

Extract from Grant Agreement: A deliverable in O2T1 would be to create a set of expected learning outcomes for each DEMO Scenarios. This will be done in consultation with the reference panel. The leader each DEMO Scenario would be responsible to compiling the targeted learning outcome for the said scenario and identifying the requirements for the development of the scenario in the next stages.

2. Reference Panel

2.1 Aim of the Reference Panel

The aim of the reference panel is to offer industry and academic insights to the partners working on the development of the applied AR demo scenarios. The role of the reference panel specifically will:

- Provide input, advice and recommendations to the project partners working on IO2;
- Review and comment on draft project documents;
- Ensure that the views and interests of the learning community are represented, and that relevant stakeholders are engaged;
- Provide an active and positive contribution to the project

2.2 Composition

The reference preference panel will be well represented by key stakeholders within Maritime VET and composed of:

- Members from various participating nationalities. Reference panel members can also include members pertaining to institutions that are external to the project but are part of the maritime VET ecosystem.
- Industry stakeholders



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- Academics
- Student Representatives / Learners

2.3 Reference Group functions

- Provide insights during selection of the DEMO Scenario Learning Outcomes
- Provide insights during design of the DEMO Scenarios
- Support through providing feedback of DEMOs products.
- Project Documents Review
- Advocacy

2.4 Nominated Board Members

Partner	Board Member	Role
Malta College of Arts, Science & Technology	Representative	Academic and Industry stakeholder
Malta College of Arts, Science & Technology	Representative	Academic
Malta College of Arts, Science & Technology	Representative	Academic
Solski Center Nova Gorica	Representative	Academic
SATAKUNTAN AMMATTIKORKEAKOULU OY	Representative	Academic
Wärtsilä Corporation	Representative	Industry stakeholder



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Knowledge Insights	Representative	Industry stakeholder
Ceronav	Representative	Academic
CENTRUL ROMAN PENTRU PREGATIREA SI PERFECTIONAREA PERSONALULUI DIN TRANSPORTURI NAVALE	Representative	Academic
Universidad La Laguna	Representative	Student

Filled in applications forms are included in Appendix 1.

2.5 Meetings

Apart from regular correspondence via email, a number of online meetings were held.

- The first meeting was held on the 20th October 2021.
- The second meeting was held on the 16th of November 2021. During the second online meeting at industry consultant on AR device was asked to join the meeting to assist the reference panel members with any technical queries, which they may, had.



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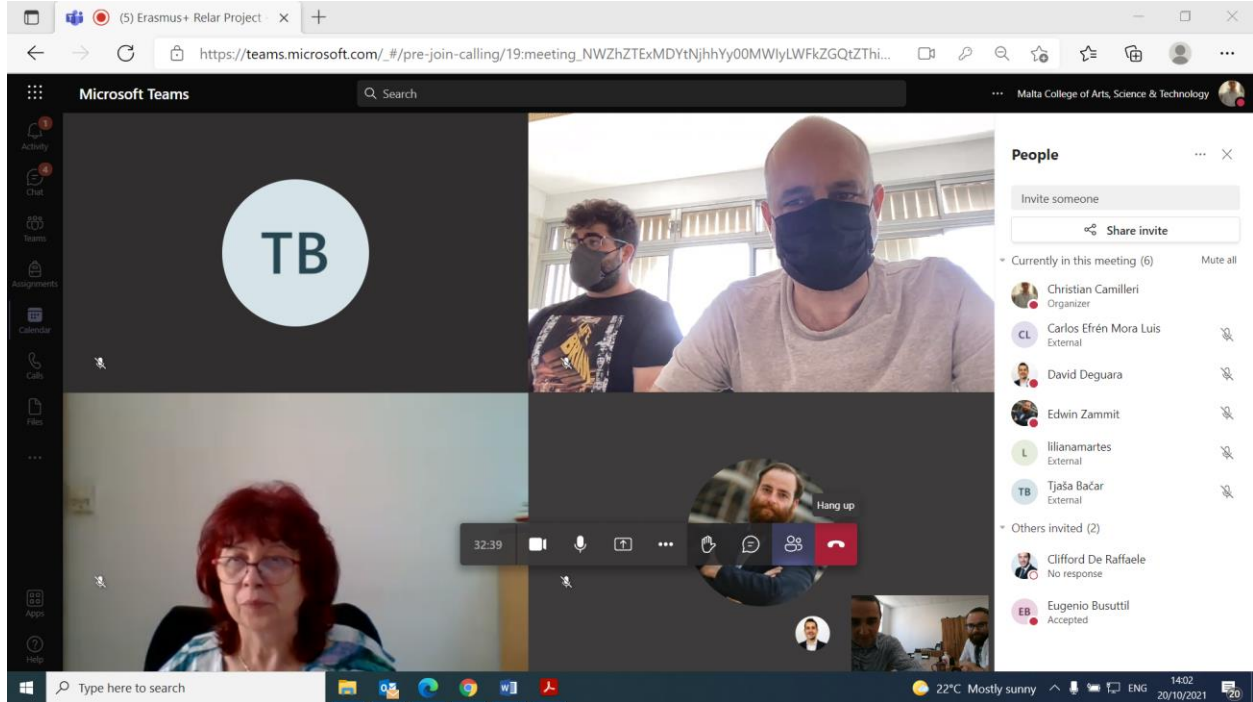


Figure 1: First online meeting held on the 20th of October 2021

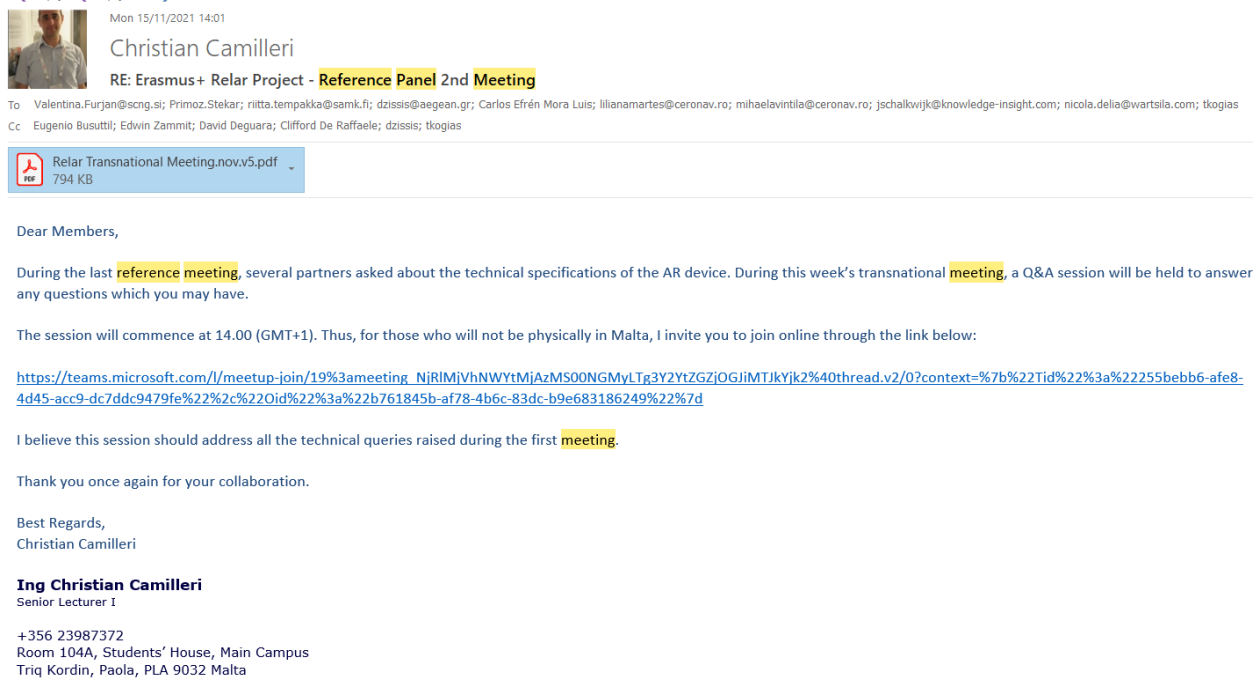


Figure 2: Email invitation for the second meeting



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2.6 Outcomes from the Reference Panel Meetings

During the reference panel meetings, the follow decisions were taken. In addition, an SOP was drafted to ensure that each partner responsible for drafting the learning outcome follows a common template.

- **First Decision:** If the expected learning outcome should be pegged at an established European Qualifications Framework (EQF) Level, from EQF 1 to EQF 8, or alternative framework that can be easily correlated to the EQF?

Agreement: It was unanimously agreed that the expected learning outcomes will be pegged with the European Qualifications Framework (EQF) Level 4.

- **Second Decision:** If the learning outcome shall have a defined credit value (ECTS) whereby one ECTS equated to 25 total learning hours?

Agreement: Each Scenario will equate to 1 ECTS with a total learning hours of 25 hours. The Scenarios should include 1) teaching material (eg. Media – videos) 2) learning topics and content and 3) guided practical exercises using the head mounted tablet. It may also include assessment materials and/or assessments through the HMT device.

- **Third Decision:** If these learning outcomes should have an assessment component and or not and if the learning outcome will result in formal certification?

Agreement: It was agreed that it will be up to the Lead partner and the supporting partners for each scenario to decide whether or not to include an assessment component. Moreover, it will be up to also the Lead Partner to decide with their learning outcome will result in formal certification.

- **Fourth Decision:** If the learning outcomes will be provided free of charge or at a cost.

Agreement: It was agreed that the material will be free of charge.



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- **Fifth Decision:** Whether the learning material should be in English or translated to each partners' respective language.

Agreement: Unanimous agreement amongst all panel members that learning material should be in the English language only.

Standard Operating Procedure agreed upon during the reference panel meetings

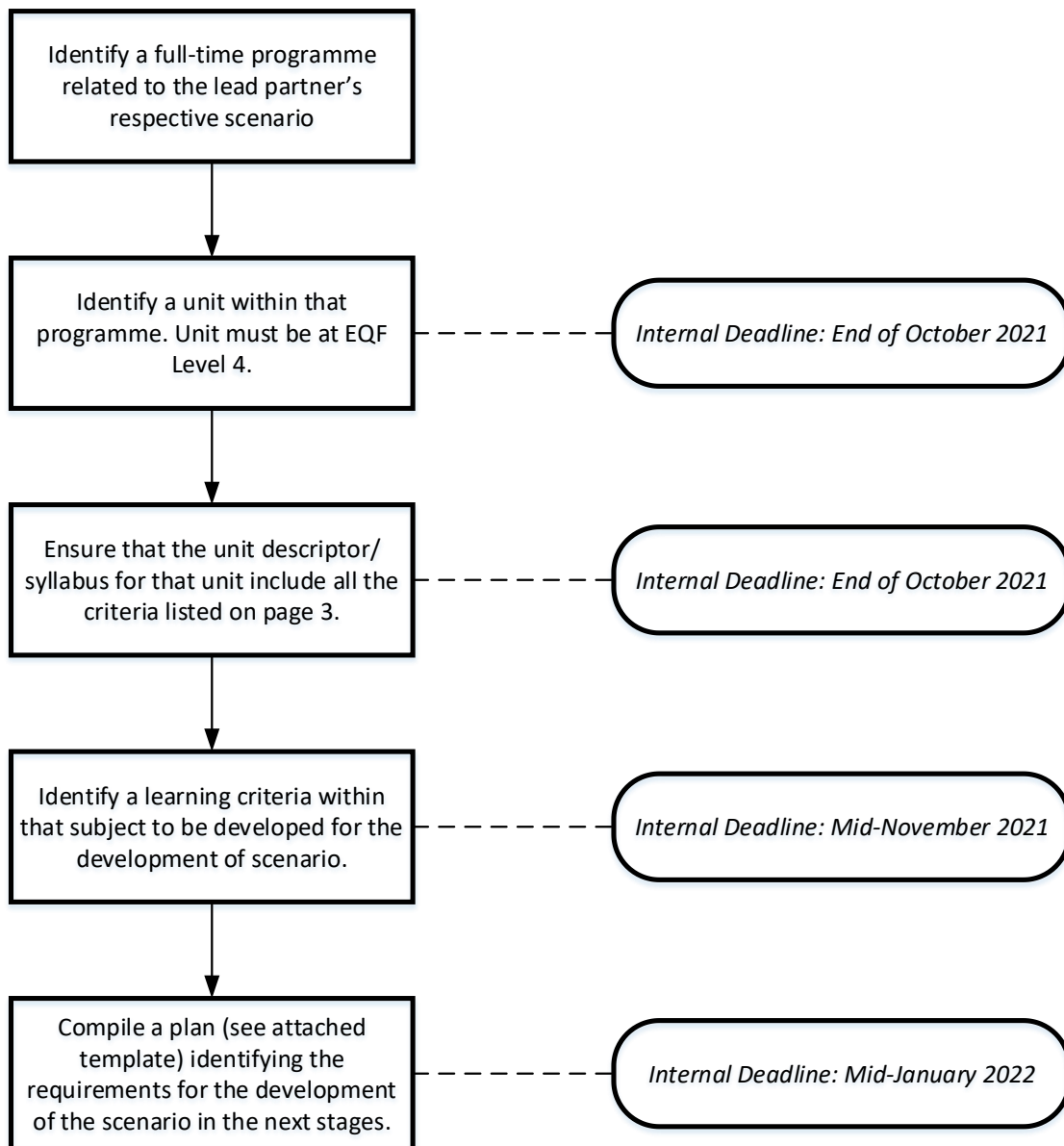


Figure 3: Suggested Standard Operating Procedure for each Lead partner responsible for developing a scenario.



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Proposed template for Unit Descriptor/Syllabus

Name of Programme:

Unit Title:

Guided Learning Hours:

Unit Level (EQF): 4

Credits:

Unit Description:

Learning Outcomes & Unit Content:

Knowledge, Skills and Competencies:

Guidance for teaching

Resources needed to deliver the course:

Reading List:

Assessment Criteria (if applicable):



3. Expected Learning Outcomes

3.1 Scenario 1: Shipyard Technician

Title of Scenario: <i>Engineering Dynamics / Tractive force against friction</i>	
Partner Leading Scenario	Malta College of Arts, Science & Technology
Partner Supporting Scenario	Aegean University
Scenario	Shipyard Technician
Programme	Diploma in Marine
Subject	Engineering Dynamics
EQF Level	ME-DME-4.1A / Level 4
Title of Lecture:	Tractive force against friction
Time/Duration	3 sessions of 3 hrs each
Aim (s) <ul style="list-style-type: none"> • To investigate the effect on tractive force due to friction between surfaces on a horizontal and an inclined plane. • To investigate the effect of varying angles of the incline • To investigate the effect of varying coefficient of friction between surfaces. 	



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Objective (s):

To determine the friction coefficients on an inclined surface. Demonstrate the effect of varying angles of incline. Eventually finding the point of equilibrium of forces on an incline due to frictional forces and the transition from static to dynamic friction

Finally verifying the correlation between the calculated and experimental values for friction.

Resources

Gunl TM225 - Friction on an incline plane experimental setup

This equipment is equipped with multiple varying variables, mainly:

- Testing at different angles of incline of the plane
- Testing different frictional coefficient materials.
- Testing at different load forces



HMT AR Headset to be used to demonstrate the capability of remote learning by the user with a closed loop feedback to the accessor.

During the session the



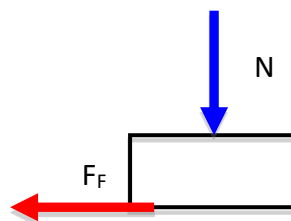
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Introduction of Lecture (Duration: 120 minutes)

Friction is the external force that always acts to oppose motion, due to contact with solid, liquids and / or gases. Example friction force between the car wheels and the road helps it move forward. In real cases the effect of friction must be taken into consideration



$$F_F = \mu N$$

Where F_F is the frictional force due to force N

N force being exerted on the box

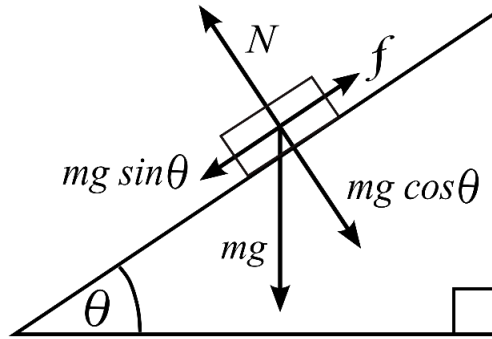
μ Coefficient of friction

Thus when a body is accelerated, the force causing acceleration is the **NET FORCE**.

$$\text{Net Force} = \text{Applied Force} - \text{Friction Force}$$



Friction on an incline will vary due to the varying component of the Normal force pushing the object on the incline as seen in the figure below.




1

Steps in developing Lecture including methodology as well as time allocated per activity

Task/Activity	Time allocated
Explanation of the theory of linear friction	60 minutes
Explanation of the theoretical effect of friction, linearly and on an incline	45 minutes
Present the students with the friction plane and various materials and loading forces to experiment with.	45 minutes
Setup the experiment with the incline plane	30 minutes
Input the varying parameters such as: <ul style="list-style-type: none"> • mass • angle • coefficient parameters through voice command and/or using input HMT AR systems (To be confirmed by the ICT team).	15 minutes



<p>The application will then show these values at the side of the screen or superimposed</p> 	
<p>Start experimenting with different materials on a flat plane to determine the frictional coefficient according to the instructions given on the Headset screen</p>	<p>45 minutes</p>
<p>Vary the inclined angle of the friction plane to determine the effect on the frictional forces according to the Headset screen instructions</p>	<p>60 minutes</p>

Conclusion of Lecture (Duration: 300 minutes total)

Students will be able to distinguish the effect of the varying angle of the incline on the friction force acting against the tractive effort. This can be thus compared to the values that they are given in their headsets.

Thus, the students will be able to demonstrate that the friction coefficient can be attained experimentally and thus compare the results attained to the values inputted by the lecturer on the Relar Headset, in the answers section.

Students will be made thus aware of the relationship between different frictional material and their respective coefficients.



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3.2 Scenario 2: Marine Engineering

Title of Scenario: Basic Cooling Systems Operation and Troubleshooting	
Partner Leading Scenario	Universidad de La Laguna
Partner Supporting Scenario	STC group
Scenario	Marine Engineering
Programme	Degree in Marine Technology
Subject/Course	Cooling and refrigeration systems.3rd year
Title of Lecture	Basic Cooling Systems Operation and Troubleshooting
EQF Level	4
Date	During the 1st semester, 1 Lecture/week
Time/duration	10 classroom hours and 15 self-study hours



Aim(s)	The unit prepares the student to perform basic operation and troubleshooting procedures in a cooling plant, including: normal start and stop, defrosting, long term stopping process, and the investigation and fixing procedures for the most malfunctioning problems.
Key Learning Objectives: After completing this unit, the student will be able to: <ul style="list-style-type: none">● (1) understanding how a cooling system works,● (2) operating a cooling plant for regular starting, stopping and defrosting,● (3) preparing a cooling system for a long-term stop,● (4) investigating common alarms in a cooling system, and● (5) fixing common malfunctions of a cooling system.	
Resources Needed: <ul style="list-style-type: none">● Cooling plant● LMS system● Electronic unit documents● HMT-1 head mounted tablet	
Knowledge, Skills and Competencies: <ul style="list-style-type: none">● Knowledge: Architecture, working principles and control strategies of a cooling system. Basic operation and troubleshooting procedures of a cooling system.● Transferable skills: Analytical thinking, problem solving, and troubleshooting linked to industrial systems, assisted reality operation of systems.	
Teaching and Learning Content: <ul style="list-style-type: none">- Description of a cooling system.- Operation of a cooling system at operation level.- Maintenance of a cooling system at operation level.	



Steps in developing Lecture including methodology as well as time allocated per activity	
<i>Task/Activity description</i>	<i>Type [Guided; Unguided; Assessment]</i>
I. Prior knowledge activation about cooling physics. Students' presentation of cooling physics based on previous knowledge and written contents given by the instructor. Self evaluation test and feedback from the instructor.	Guided
II. Hardware architecture of a cooling system. Physical description of a real cooling plant by the instructor. Self evaluation test and feedback from the instructor.	Guided
III. Control architecture of a cooling system. Physical description of the control board and its components. Self evaluation test and feedback from the instructor.	Assessment
IV. Description of a cooling system at operation level. Students should discuss the function of each human-machine interface component and matching them in the control schematics. Self evaluation test and feedback from the instructor.	Assessment
V. Starting, stopping, and defrosting procedures. Students will be given a written procedure. They should follow it in a real cooling plant with a HTM-1 headset. Instructor will assist the student remotely during the operation. Briefing and debriefing processes can be included as part of the learning process.	Assessment



<p>VI. Long-term stopping procedure. Students will be given a written procedure. They should follow it in a real cooling plant with a HTM-1 headset. Instructor will assist the student remotely during the operation. Briefing and debriefing processes can be included as part of the learning process.</p>	<p>Assessment</p>	<p>2 hours</p>
<p>VII. Alarms and safety controls of a cooling system. Students will be given a safety diagram of the cooling plant. During teaching hours, and with the assistance of the instructor, students will elaborate the catalogue of alarms of a real cooling plant.</p>	<p>Assessment</p>	<p>1 hour</p>
<p>VIII. Fixing common faults and alarms. Students will be exposed to alarms during their operation procedure with HTM-1 headset. Students should use written instructions to fix the problem. Instructor will assist the student remotely during the operation. Briefing and debriefing processes can be included as part of the learning process.</p>	<p>Assessment</p>	<p>2 hours</p>
<p>Use of Headmounted tablet: Exercises V, VI and VIII. Remote assistance, workflow creation and workflow testing</p>		
<p>Further remarks:</p>		



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3.3 Scenario 3: Logistics/Fleet Assistance

Title of Scenario: Inspection of shipping container of hazardous chemical (Hydrochloric Acid).	
Institute:	
Partner Leading Scenario	Satakunta University of Applied Sciences, School Center Nova Gorica
Partner Supporting Scenario	SAMK
Scenario	Logistics/Fleet Assistance
Programme	Logistics technician
Subject	Logistics of traffic flows
EQF Level	4
Credits	3 ECTS
Title of Lecture	HMT-1
Date:	March 4 th 2022
Time/Duration:	25 hours, a four day delivery
Aim (s): Theoretical understanding of the hazardous chemical container inspection in general context. Practical understanding of the entry level inspection of a hazardous chemical container inspection.	



Objective (s):

Limited cognitive and practical skills to safely conduct the inspection of a hazardous chemical container.

Ability to work independently with foreseeable tasks with limited changes in working environment and related regulatory framework and rules.

Partial ability to supervise routine tasks conducted by others.

Resources Needed:

HMT-1 glasses

Internet connection

European Chemicals Agency Material Safety Data Sheet writing notes

UN number of hydrochloric acid

Medical first aid instructions

Fire safety data sheet

Hazardous Container Inspection Checklist

Container with Hydrochloric Acid

Knowledge, Skills and Competencies:

Competency:

A competent person possesses general training for the safe inspection of hazardous chemicals. The level of competence required for the inspection of the container does not embed the competency to physically handle the chemical in bulk form.

Knowledge:

A competent person is knowledgeable of the key regulations related to the storage and handling of the chemical. He/she is able to recognize, assess and manage the risks related to the inspection of the cargo container containing hazardous chemical.

Skills

A competent person possesses necessary skills to utilize the HMT-1 glasses including connecting the HMT-1 glasses to internet. He/she possesses skills to interpret the material safety data sheet and cargo container safety labels. He/she possesses skills to identify leakages, bruises, dents,



overheating, freezing, fire and related emergency situations. He/she knows how to act as a first responder and is familiar with the emergency notification procedure.

Steps in developing Lecture including methodology as well as time allocated per activity

Task/Activity	Methodology	Time allocated	Course day
Introduction of the course syllabus, pre-requisites, and course schedule.	Interactive Lecture, contact Lecture.	1h	1
Student familiarization with the HMT-1 capabilities.	Interactive Lecture, contact Lecture.	1h	1
Basic use of the glasses including different applications.	Directed instruction, contact Lecture.	3h	1
Connecting the HMT-1 online.	Directed discussion, contact Lecture.	1h	1
Use of online meeting applications with the HMT-1.	Directed instruction, contact Lecture.	2h	2
Material safety data sheets and container labelling.	Interactive Lecture using HMT-1.	1h	2



Safe handling of chemicals.	Interactive Lecture using HMT-1.	2h	2
Risk management.	Interactive Lecture using HMT-1.	1h	2
Emergency preparedness.	Interactive Lecture using HMT-1.	2h	3
Conducting an inspection, use case approach on site.	Interactive Lecture, contact Lecture.	4h	3
Conducting an inspection, use case approach on site.	Interactive Lecture using HMT-1.	4h	4
Debriefing session.	Interactive Lecture, contact Lecture.	1h	4
Self-assessment	Interactive Lecture using HMT-1.	1h	4
Assessment	Interactive Lecture using HMT-1.	1h	4



Conclusion of Lecture

- The instructor was well prepared for Lectures.
- The instructor communicated clearly and was easy to understand.
- The instructor encouraged student participation in discussions.
- The instructor presented course material in a clear manner.
- I learned new things in this course.
- Course contents met my expectations.

Other Remarks:

Reading List:

- Risk management study material
- Chemical handling study material
- Chemical container inspection check list
- Emergency procedures
- Safety data sheet for hydrochloric acid
- Firefighting measures
- First aid measures

Web sites with useful information:

https://beta-static.fishersci.com/content/dam/fishersci/en_US/documents/programs/education/regulatory-documents/sds/chemicals/chemicals-h/S25358.pdf

<https://support.realwear.com/knowledge/realwear-hmt-1-product-overview>

Assessment Criteria (if applicable):

1-2 Satisfactory

Holding common level of skills and knowledge. Student manages basic contents without solid ability to connect various items and learning outcomes together.

3-4 Good

Holding level of skills and knowledge above medium level. Student acceptably manages working situations with multiple occurrences connected together.

5 Excellent



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Holding excellent level of skills and knowledge. Student effortlessly manages working situations with multiple occurrences connected. Student demonstrates analytical approach to problems utilizing resources to find the answer. He co-exists and communicates proactively and seamlessly with other team members.



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4. Appendix 1



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: *MCAST*
Suggested Board Member: *EUGENIO BUSUTTI*

Type:

- Industry Representative
- Academic
- Student

Nominated Board Member:

Signature:



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: *MCAS T*

Suggested Board Member: *Edwin Zemanit*

Type:

- Industry Representative
- Academic
- Student

Nominated Board Member:

Signature:



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: *MCAST*

Suggested Board Member: *Christian Camilleri*

Type:

- Industry Representative
- Academic
- Student

Nominated Board Member: *Christian Camilleri*

Signature:



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: Šolski center Nova Gorica

Suggested Board Member: Janko Harej

Type:

- Industry Representative
- Academic
- Student

Nominated Board Member: Janko Harej

Signature:

Date: 24 June 2021



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: Satakunta University of Applied Sciences

Suggested Board Member: Riitta Tempakka, Dean, Faculty of Logistics and Maritime
Technology

Type:

Industry Representative

Academic

Student

Nominated Board Member: Riitta Tempakka

Signature: Riitta Tempakka
Riitta Tempakka (Jun 10, 2021 23:44 GMT+3)



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: WARTSILA VOYAGE

Suggested Board Member: NICOLA D'ELIA

Type:

- Industry Representative
- Academic
- Student

Nominated Board Member: NICOLA D'ELIA

Signature: *Nicola D'Elia*

Date: 25/06/2021



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: STC Group

Suggested Board Member: Jan Schalkwijk

Type:

- Industry Representative
- Academic
- Student

Nominated Board Member:

Signature:

Date:
June 16th 2021



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: CERONAV -

Suggested Board Member: PIPIRIGEANU VASILE

Type:

- Industry Representative
- Academic
- Student

Nominated Board Member: PIPIRIGEANU VASILE

Signature:

Date: 07.06.2021



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Nomination of board member

Each partner in the consortium is kindly invited to nominate one member by the 9th of June 2021

Name of Project Partner: University of La Laguna

Suggested Board Member: Aarón Miguel Acevedo Reverón

Type:

- Industry Representative
- Academic
- Student

Nominated Board Member:

Signature:

Date: 17/11/21