**IALA Model Course**

V-103/1

Vessel Traffic Services Operator Training

Revised document through intersessional work

Edition 2.0

December 2009

Revisions to this IALA Document are to be noted in the table prior to the issue of a revised document.

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| --- | --- | --- |
| Date | Page / Section Revised | Requirement for Revision |
| March 1988 | 1st issue |  |
| December 2005 | Ed.1.1 |  |
| December 2009 | Ed.2  Entire document | Reflecting 10 years’ experience and the evolution of technology |
| [date] | Entire document | [text] |
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[PART A MODEL COURSE OVERVIEW 5](#_Toc97073035)

[1. Introduction 5](#_Toc97073036)

[2. Purpose of the Model Course 5](#_Toc97073037)

[3. Course Objective 5](#_Toc97073038)

[4. Course Curriculum Outline 6](#_Toc97073039)

[5. Entry Requirements 6](#_Toc97073040)

[6. Course Intake - Limitations 7](#_Toc97073041)

[7. Training Staff Requirements 7](#_Toc97073042)

[8. Facilities and Equipment 7](#_Toc97073043)

[9. Delivery of the Model Course 7](#_Toc97073044)

[9.1. Developing course content 8](#_Toc97073045)

[9.2. Competence levels 10](#_Toc97073046)

[9.3. Competence tables, teaching aids and references 10](#_Toc97073047)

[9.4. Course review and updating 10](#_Toc97073048)

[10. Assessment 10](#_Toc97073049)

[11. Certification 11](#_Toc97073050)

[12. Acronyms 11](#_Toc97073051)

[13. SUBJECT FRAMEWORK 13](#_Toc97073052)

[13.1. Scope 13](#_Toc97073053)

[13.2. Objective of Module 1 13](#_Toc97073054)

[13.3. Suggested Training aids and exercises 13](#_Toc97073055)

[13.4. References relevant to this module 13](#_Toc97073056)

[14. SUBJECT FRAMEWORK 19](#_Toc97073057)

[14.1. Scope 19](#_Toc97073058)

[14.2. Objective of Module 2 19](#_Toc97073059)

[15. SUBJECT FRAMEWORK 24](#_Toc97073060)

[15.1. Scope 24](#_Toc97073061)

[15.2. Objectives of Module 4 24](#_Toc97073062)

[15.3. Suggested Training aids and exercises 24](#_Toc97073063)

[15.4. References relevant to this module 24](#_Toc97073064)

[16. SUBJECT FRAMEWORK 34](#_Toc97073065)

[16.1. Scope 34](#_Toc97073066)

[16.2. Objectives of Module 5 34](#_Toc97073067)

[16.3. Suggested Training aids and exercises 34](#_Toc97073068)

[16.4. References relevant to this module 34](#_Toc97073069)

[16.5. Suggested Training aids and exercises 39](#_Toc97073070)

[16.6. References relevant to this module 39](#_Toc97073071)

FOREWORD

The International Association of Marine Aids to Navigation and Lighthouse Authorities has been associated with Vessel Traffic Services since 1955 and recognises the importance of human resources to the development of efficient Vessel Traffic Services worldwide.

Taking into account the International Convention on Standards of Training, Certification and Watchkeeping of Seafarers, 1978, as amended in 1995 (STCW Convention), the Seafarer’s Training, Certification and Watchkeeping Code (STCW Code) and STCW 95 Resolution 10, IALA has adopted Recommendation V-103 on Standards of Training and Certification of VTS personnel.

The model training courses developed, or being developed, by IALA for VTS personnel are:

* Model Course V-103/1 - VTS Operator Training
* Model Course V-103/2 - VTS Supervisor Training
* Model Course V-103/3 - VTS On-the-Job Training
* Model Course V-103/4 - VTS On-the-Job Training Instructor
* Model Course V-103/5 – VTS Revalidation Process for VTS Qualification and Certification

These model courses are intended to provide national members and other appropriate authorities charged with the provision of vessel traffic services with specific guidance on the training of VTS Personnel. They may be used by maritime training organisations, and assistance in implementing any course may be obtained through IALA at the following address:

The Secretary-General

IALA Tel: (+) 33 1 34 51 70 01

10 rue des Gaudines, 78100 Fax: (+) 33 1 34 51 82 05

Saint Germain-en-Laye e-mail: [academy@iala-aism.org](mailto:academy@iala-aism.org)

France Internet: [www.iala-aism.org](http://www.iala-aism.org)

1. MODEL COURSE OVERVIEW

# Introduction

IALA Model Courses are training documents which define the level of training and knowledge needed to reach levels of competence defined by IALA.

**IMO Resolution A.### (XX)** states that *“VTS personnel should only be considered competent when appropriately trained and qualified for their VTS duties.”* This includes, inter alia:

* satisfactorily completing generic VTS training approved by a competent authority; and
* being in possession of appropriate certification.

**IALA Recommendation 0103** **- Training and Certification of VTS personnel** specifies the practices associated with the training and certification of VTS personnel to assist authorities when recruiting, training and assessing VTS personnel to ensure the harmonized delivery of vessel traffic services world-wide.

**IALA Guideline 1156 - Recruitment, training and assessment of VTS personnel** states that *“Model courses provided by accredited training organisations should be approved by the competent authority.”*

**IALA Guideline 1014 -** **Accreditation of VTS training organizations and approval to deliver IALA model courses** sets out the process by which a training organisation can be accredited to deliver approved VTS training courses.

# Purpose of the Model Course

The purpose of the model course is to assist maritime training organisations and their teaching staff in the preparation and introduction of new training courses for VTS Operators, or in enhancing, updating or supplementing existing training material. This document defines the level of training and knowledge needed to reach levels of competence defined by IALA to obtaining a V103/1 certificate.

It is not the intention of the model course to present instructors with a rigid ‘teaching package’. Rather, this model course provides the curriculum content for the training for VTS Operators. It intended to be used by accredited training organisations in preparing their V103/1 training programs.

# Course Objective

Upon successful completion of this course the student should have demonstrated the requisite knowledge, skills and attitude to undertake the duties associated with the provision of a VTS Operator to:

* provide timely and relevant information on factors that may influence the transit of a ship and assist on-board decision making;
* monitor and manage traffic to ensure the safety and efficiency of ship movements; and
* respond to developing unsafe situations to assist the decision-making process on board.

Note – As described in A.###(XX) *“VTS personnel should only be considered competent when appropriately trained and qualified for their VTS duties. This includes:*

* *satisfactorily completing generic VTS training approved by the competent authority;*
* *satisfactorily completing on-the-job training at the VTS where the person is employed;*
* *undergoing performance assessment and revalidation training to ensure competence is maintained; and*
* *being in possession of appropriate certification.”*

# Course Curriculum Outline

The complete course comprises seven modules, each of which deals with a specific subject representing a requirement or function of a VTS Operator. Each module contains a subject framework stating its scope and aims, a subject outline, learning objectives and teaching points.

Training activities, simulated exercises and assessments undertaken during the course are intended to represent the role of the VTS Operator and reflect events or incidents that may be experienced at a VTS.

Each module identifies the total recommended number of hours that should be allotted. The recommended hours are indicative, and instructors should revise as required to address the requirements of the students to ensure the learning outcomes are achieved.

The recommended duration in hours does not include the time necessary for assessments and evaluations. Further, the instructor should allow time during the course for revision of course content.[table X refers]

| Module Title | Recommended Duration in Hours | | Overview |
| --- | --- | --- | --- |
| Presentations / Lectures | Exercises / Simulation |
|  |  |  | [copy text from the next section – which describes what the module is about] |
|  |  |  |  |
|  |  |  |  |
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# Entry Requirements

Every student attending a V-103 model course should have achieved the International English Language Testing System (IELTS) level 5, or its equivalent.

The training organisation may determine, and document, any additional course entry requirements for example, due to national requirements or tailoring the course for the student intake.

Consideration should also be given to the recognition of prior learning, which may reduce the time requirement to meet the level required for certification.

*IALA Guideline 1017 - Assessment for recognition of prior learning in VTS training* provides further guidance assessing and recognizing the prior learning of students.

# Course Intake - Limitations

The training organization should determine the number of students enrolled on the course and provide information on the student to staff ratio. The class/group size should allow the instructor(s) to give adequate individual attention to students as required to meet the learning objective(s).

In general, it is recommended that 8-10 students is the maximum that a single instructor can be expected to train satisfactorily to the level of competence involved. Larger numbers may be admitted depending on the method of delivery.

During practical sessions such as simulations, there may be additional restraints on class/group size. Where the use of a simulator or similar teaching aid is involved, it is recommended that no more than two students be trained simultaneously on any individual piece of equipment.

# Training Staff Requirements

All instructors and assessors should be appropriately qualified for the training being provided and the assessment required for the model course.

As well as instructors and assessors, additional staff may be required for the maintenance of equipment and for the preparations of materials, work areas and supplies for the practical work.

*IALA Guideline 1156 - Recruitment, training, and assessment of VTS Personnel* provides further guidance on the qualifications for instructors.

# Facilities and Equipment

The teaching aids, facilities and equipment students will utilise during the course should be fit for purpose and of a sufficient standard to reflect the training methodologies used in the course delivery. Examples of training methodologies may include:

* classroom sessions
* group based learning activities
* remote learning (e.g. e-learning, online, distance, hybrid, blended)
* simulation training.

Training should be managed in a manner consistent with IALA Guideline 1027 in order to provide sufficient behavioural realism to allow students to acquire the knowledge and skills appropriate to the training objectives.

The training organisation should provide for safe learning environment consistent with any national health and safety requirements.

# Delivery of the Model Course

To make effective use of the model course, training staff should review the course outline, including the competence tables for each module, and prepare a detailed teaching syllabus. The instructor should take into consideration existing knowledge, skills and attitudes of students to support the assessment and recognition of prior learning. A gap analysis should be carried out to identify any differences between the level of skills and competencies of the student and those identified within the curriculum tables, and teaching strategies to address these gaps should be implemented.

*IALA Guideline 1017 - Assessment for recognition of prior learning in VTS training* provides further guidance assessing and recognizing the prior learning of students.

All training and assessment for VTS training should be:

1. Structured in accordance with written programmes, including such methods and means of delivery, procedures and course material as are necessary to achieve the prescribed standard of competence; and,
2. Conducted, monitored, assessed, and supported by qualified persons.

Teaching programmes should ensure that all listed elements are addressed in some manner, and that this is clearly documented.

If students are required to meet additional requirements, then the module objectives, scope and content for each subject may be adjusted to ensure the additional elements are covered. All changes to the training should be clearly documented.

The presentation of concepts and methodologies may be repeated as necessary in various ways until the instructor is satisfied that the student has attained a good working knowledge in each subject.

**Thorough preparation is key to successful implementation of the course.**

## Developing course content

The modular presentation enables the instructor to adjust the course content to suit the student intake and provide any revisions of the subject objectives as required. The instructor should develop lesson plans and detailed learning objectives based on the competence tables, references, and materials as suggested (see Part B).

It is not intended that the modules be presented in the order provided in this model course. It is expected that, to address effective training and learning methodologies, the content of modules will be grouped as appropriate for the learning environment. Presentation of the material should be tailored to reflect specific training objectives and include practical exercises, assessments, etc. When developing lesson plans, the instructor should use a teaching method or combination of methods that will ensure students can achieve the required learning objectives.

Depending on the student intake, the recommended hours may need to be adjusted as necessary. For example, it is normal for different students to require different lengths of time to cover the same content, and minor adjustments may be needed to the course timetable.

1. Competence Level Taxonomy for VTS Training

|  |  |  |  |
| --- | --- | --- | --- |
| Level | Knowledge and/or Attitude | Skill | Verbs (examples) |
| **Level 1**  Work of a routine and predictable nature generally requiring supervision | **Comprehension**  Understands facts and principles; interprets verbal/written material; interprets charts, graphs and illustrations; estimates future consequences implied in data; justifies methods and procedures | **Guided response**  The early stages in learning a complex skill and includes imitation by repeating a demonstrated action using a multi-response approach (trial and error method) to identify an appropriate response | Define, list, , locate, sketch, label, , follow (instructions), select, show willingness, operate, arrange, identify |
| **Level 2**  More demanding range of work involving greater individual responsibility. Some complex/non-routine activities | **Application**  Applies concepts and principles to new situations; applies laws and theories to practical situations; demonstrates correct usage of methods or procedures | **Autonomous response**  The learned responses have become habitual, and the movement is performed with confidence and proficiency | Demonstrate, describe recognise, perform, display, paraphrase, proceed, comply, give examples, , |
| **Level 3**  Skilled work involving a broad range of work activities. Mostly complex and non-routine | **Analysis**  Recognises un-stated assumptions; recognises logical inconsistencies in reasoning; distinguishes between facts and inferences; evaluates the relevancy of data; analyses the organisational structure of work | **Complex observable response**  The skilful performance of acts that involve complex movement patterns. Proficiency is demonstrated by quick, smooth, accurate performance. The accomplishment of acts at this level includes a highly co-ordinated automatic performance | Analyse, apply, justify, differentiate, manipulate, demonstrate, categorise, classify, solve, operate, explain |
| **Level 4**  Work that is often complex, technical and professional with a substantial degree of personal responsibility and autonomy | **Synthesis**  Integrates learning from different areas into a plan for solving a problem; formulates a new scheme for classifying objects or events | **Adaptation**  Skills are so well developed that individuals can adapt rapidly to special requirements or problem situations | , evaluate, devise, explain, assess, compare, adapt, plan, rearrange, organise, predict, resolve, use,Interpret |
| **Level 5**  Complex techniques across wide and often unpredicted variety of contexts. Professional/senior managerial work | **Evaluation**  Judges the adequacy with which conclusions are supported by data; judges the value of a work by use of internal criteria; judges the value of a work by use of external standards of excellence | **Creation**  The creation of new practices or procedures to fit a particular situation or specific problem and emphasizes creativity based upon highly developed skills | create, Judge, evaluate, criticise, construct, compose, draw conclusion, synthesize, coordinate, formulate, improve, modify |

## Competence levels

To assist in the development of lesson plans, five levels of competence are used in the model courses for VTS personnel. Levels 1 to 4 are used in the model course for the training of VTS Operators and levels 3 to 5 are used in the model course for VTS Supervisor. Verb taxonomies have been provided with these levels to assist with the creation of detailed learning objectives. [table X refers]

*IALA Guideline 1103 – Train the trainer* assists instructors with the preparation and development of training courses and is aimed at courses delivered an accredited training organisation.

## Competence tables, teaching aids and references

Detailed competence tables are provided, including competence levels and proposed teaching aids and references. The training materials prepared (eg course notes, course presentations and reference documents etc) should be consistent with IALA standards and up-to-date taking into account recent changes and industry developments. These training materials should be available to the student for their reference.

Where remote learning delivery is proposed, training organizations should consider the necessary adjustments that may be required.

*IALA Guideline 1014 – Accreditation of VTS training organizations and approval to deliver IALA model courses* provides further detail on remote learning.

## Course review and updating

The course content should be reviewed on a regular basis to ensure it reflects the current IALA standards, recommendations, guidelines and takes into account recent changes and industry developments.

On conclusion of the course, a review should be undertaken based on course feedback and observations during course delivery to identify ongoing improvements and training materials that may need updating.

# Assessment

Student progress should be continually monitored and assessed, and regular reviews undertaken. Any problems that may arise should be addressed so that the student can attain the required levels of competence and has the opportunity to meet the course objectives.

Assessments should reflect the level of competence required, as provided in the competence tables for each module.

The training organisation should determine the assessment methods to be used to ensure competence levels have been attained for each subject of the module course. In addition, the training organisation should have procedures in place to address instances where the student is unable to attain the required competence.

Assessment results should be recorded and retained in accordance with national and/or organisational requirements as evidence to indicate the competence levels that have been attained for each subject of the model course.

# Certification

A course certificate should be issued by the training organisation where a student:

* demonstrates they have the theoretical and practical knowledge, and
* has passed the appropriate assessments to ensure the student has met the required competency as outlined in this model course.

# Acronyms

AIS Automatic Identification System(s)

APL Accredited Prior Learning

ARPA Automatic Radar Plotting Aid

CCTV Close circuit television

COLREGS International Regulations for Preventing Collisions at Sea

DF Direction Finding

DGNSS Differential Global Navigation Satellite System(s)

DR Dead reckoning

DSC Digital Selective Calling

ECDIS Electronic Chart Display and Information System(s)

ECS Electronic Chart System(s)

EP Estimated position

ETA Estimated Time of Arrival

GMDSS Global Maritime Distress and Safety System

GNSS Global Navigation Satellite System(s)

IALA International Association of Marine Aids to Navigation and Lighthouse Authorities - AISM

ICAO International Civil Aviation Organization

IELTS International English Language Test System

IMO International Maritime Organization

ISBN International Standard Book Number

ISPS International Ship and Port Facility Security (Code)

Lat Latitude

LBP Length between perpendiculars

LLTV Low light television

LOA Length overall

LOCODE United Nations Code for Trade and Transport Locations

Long Longitude

LNG Liquified Nitrogen Gas

LOP Line(s) of position

LPG Liquified Petroleum Gas

MAS Maritime Assistance Service

OJT On-the-Job Training

PTT Press To Talk

Racon Radar beacon(s)

Ramark Radar mark(s)

ROC Restricted Operator’s Certificate (GMDSS)

Ro-ro Roll on – roll off

RR Radio Regulations

SAR Search and Rescue

SMCP Standard Marine Communication Phrases (IMO)

STCW Standards of Training, Certification and Watchkeeping of Seafarers, 1978, as amended

VHF Very High Frequency (30 MHz to 300 MHz)

VDES VHF Data Exchange System

VTMIS Vessel Traffic Management Information System(s)

VTS Vessel Traffic Services

1. COMMUNICATION

# English is the accepted language of international business, trade and diplomacy. This has led to the establishment of reliable tests to demonstrate that students have attained a sufficient level of the English language. This module assumes the minimum level of English has been obtained as identified in IALA Guideline 1156 and has appropriate national qualifications to operate the VHF marine radiotelephony equipment.SUBJECT FRAMEWORK

## Scope

This module covers the communications principles used in VTS operations. It also encourages the use of standard phraseology when communicating with vessels and allied services to:

* Facilitate clear, concise, and unambiguous communications in routine and emergency situations as referenced in IMO Resolution A.1158(32).
* Minimise misunderstanding of the intent of messages and reducing the time required for effective communication.

[Note: In some instances, communications may include training in the use of an agreed, alternative language. This is not included in the V-103/1 course. The training in this alternative language could be as agreed between the Training Authority and Competent Authority.]

## Objective of Module 1

On completion of the module the student will communicate using consistent, clear and concise maritime English that reflects standard message structure, including:

* standard phrases for communicating with vessels and allied services using IMO Standard Marine Communication Phrases and IALA G1132 on VTS voice communications and phraseology
* concepts of message construction in terms of compiling, delivering and interpret messages
* effective communication skills
* managing the collection, evaluation and dissemination of VTS information
* handover procedures

## Suggested Training aids and exercises

The teaching methods for that are suggested for use in the delivery of this module include:

* Classroom presentations and facilitated discussion
* Case studies
* Simulation [and recordings]

## References relevant to this module

The following references are relevant to the planning and delivery of this module:

* 1. SUBJECT OUTLINE OF MODULE 1

1. Subject outline – Communication Coordination and Interaction

|  |  |  |  |
| --- | --- | --- | --- |
| **Element** | **Recommended Competence Level** | **Recommended Hours1** | |
| **Presentations/ Lectures** | **Exercises/ Simulation** |
| **General communication skills** |  |  |  |
| Clear, concise and consistent communications | Level 3 |  |  |
| Procedures to enhance effective communication | Level 3 |  |  |
| Verbal and non-verbal communications | Level 3 |  |  |
| Options to overcome barriers to communication | Level 3 |  |  |
| Questioning techniques | Level 3 |  |  |
| Eliminate ambiguity | Level 3 |  |  |
| **IALA Specific VTS message construction** |  |  |  |
| VTS message construction | Level 4 |  |  |
| **IMO SMCP / Standard phrases** |  |  |  |
| Advantages, disadvantages and application | Level 4 |  |  |
| **Information Management** |  |  |  |
| Collection, evaluation and dissemination of data | Level 3 |  |  |
| Logkeeping and record keeping | Level 2 |  |  |
| **Handovers** |  |  |  |
| Handovers in VTS | Level 4 |  |  |
| **Use of VHF radio communication in VTS**  Communication procedures, non-routine operations | Level 4 |  |  |
| Routine communications | Level 4 |  |  |
| Non-routine (distress, urgency, safety, other) | Level 4 |  |  |
|  |  | Total 91 +7 + 11 hours | Total 75 +11 + 31 hours |

* 1. DETAILED Competence table FOR MODULE 1 – Communication Coordination and interaction

1. Competence Table – Communication Coordination and Interaction

| Element | *Session Objective* | Sub-element | Subject Elements | Level of Competence |
| --- | --- | --- | --- | --- |
| **1.1** | **General Communication Skills** |  |  |  |
| **1.1.1** | *Demonstrate clear, concise and consistent general communication skills.* | 1.1.1.1 | Active listening skills | 3 |
| 1.1.1.2 | Interpersonal skills | 3 |
| 1.1.1.3 | Effective team communications | 3 |
| 1.1.1.4 | Empathy in communication | 3 |
| **1.1.2** | *Demonstrate procedures to enhance effective communication* | 1.1.2.1 | Reading-back received message | 3 |
| 1.1.2.2 | Breaking message into smaller components | 3 |
| 1.1.2.3 | word grouping and pauses | 3 |
| 1.1.2.4 | Rephrasing message |  |
| **1.1.3** | *Demonstrate verbal and non verbal communications* | 1.1.3.1 | Voice and digital communications | 3 |
| 1.1.3.2 | Voice inflection, tone and volume | 3 |
| 1.1.3.3 | Speech rate, keyword emphasis, word grouping and pauses | 3 |
| 1.1.3.4 | Non-verbal communication |  |
| **1.1.4** | *Identify options to overcome barriers to communication* | 1.1.4.1 | Language differences | 3 |
| 1.1.4.2 | Empathy, fatigue and emotional aspects | 3 |
| 1.1.4.3 | Cultural aspects | 3 |
| **1.1.5** | *Demonstrate effective questioning techniques* | 1.1.5.1 | Direct questioning using message markers | 3 |
| 1.1.5.2 | Voice inflection in questioning | 3 |
| 1.1.5.3 | Specific question types (closed, open, funnel) | 3 |
| **1.1.6** | *Describe the techniques to eliminate ambiguity* | 1.1.6.1 | ‘Conditional’ words and their elimination in VTS messages | 3 |
| 1.1.6.2 | Consequences of misuse of ‘conditional’ words | 3 |
| **1.2** | **VTS Communication Phrases** |  |  |  |
| **1.2.1** | *Explain the**importance of using standard phraseology* | 1.2.1.1 | Introduction to IALA G1132 on VTS voice communications and phraseology | 4 |
|  |  | 1.2.1.2 | Introduction to SMCP - Its overall construction and origins | 4 |
| **1.2.2** | *Construct VTS messages using standard phraseology.* | 1.2.2.1 | Message structure | 4 |
| 1.2.2.2 | Use of message markers | 4 |
| 1.2.2.3 | Use of standard VTS phraseology consistent with G1132 | 4 |
| 1.2.2.4 | Use of the SMCP, particularly during emergency situations and distress (focus on Part 3, section 6 of the SMCP). | 4 |
| 1.2.2.5 | Use of standard phrases to trigger predictable actions | 4 |
| 1.2.2.6 | Identifying options for alternative wording to clarify understanding | 4 |
| **1.3** | **Information Management** |  |  |  |
| **1.3.1** | *Demonstrate collection, evaluation and dissemination of data (information) management in VTS.* | 1.3.1.1 | Collect data | 3 |
| 1.3.1.2 | Evaluate data – verify, validate | 3 |
| 1.3.1.3 | Evaluate data - prioritise | 3 |
| 1.3.1.4 | Disseminate data – methods | 3 |
| 1.3.1.5 | Disseminate data – phrasing, timing and content | 3 |
| **1.3.2** | *Explain logkeeping and record keeping (recording) in VTS.* | 1.3.2.1 | Objectives of logkeeping and recording | 3 |
| 1.3.2.2 | Principles of logkeeping / retention | 2 |
| 1.3.2.4 | Methods of logkeeping | 2 |
| 1.3.2.5 | Statement and report writing | 2 |
| **1.4** | **Handovers** |  |  |  |
| **1.4.1** | *Demonstrate handovers in VTS* | 1.4.1.1 | Handing over the shift | 4 |
| 1.4.1.2 | Vessel handovers | 4 |
| **1.5** | **Use VHF Communication** |  |  |  |
| **1.5.1** | *Demonstrate the use of proper VHF Communications in VTS* | 1.5.1.1 | VHF radio procedures | 4 |
| 1.5.1.2 | VHF use in routine VTS operations | 4 |
| 1.5.2.1 | Distress, Urgency and Safety VHF radio procedures | 4 |

1. LEGAL FRAMEWORK

# SUBJECT FRAMEWORK

## Scope

This module covers the regulatory and legislative framework of VTS, including the liabilities and the responsibilities of allied services and participating ships in the VTS.

## Objective of Module 2

On completion of the module the student will explain the role of legal and regulatory framework in VTS, including:

* national and international regulations
* legal liabilities and their implications to VTS
* the roles, responsibilities of and relationships between ship masters, marine pilots, VTS and allied services
* importance of record and log keeping.
  1. Suggested Training aids and exercises

The teaching methods for that are suggested for use in the delivery of this module include:

* Classroom presentations and facilitated discussion
* Case studies
* Simulation
* E-learning
* [to be developed]
  + 1. References relevant to this module

The following references are relevant to the planning and delivery of this module:

[to be developed…]

* 1. SUBJECT OUTLINE OF MODULE 2

1. Subject outline – Legal Framework

| Subject Area | Recommended Competence Level | Recommended Hours | |
| --- | --- | --- | --- |
| Presentations/ Lectures | Exercises |
| **Regulatory requirements** |  |  |  |
| Maritime organisations | Level 2 |  |  |
| Legislative requirements | Level 3 |  |  |
| Regulatory and legal framework | Level 3 |  |  |
| Promulgation of maritime information | Level 1 |  |  |
| **Legal liabilities** |  |  |  |
| Related to VTS functions | Level 3 |  |  |
| **Roles and responsibilities** |  |  |  |
| Ship masters, marine pilots, VTS and allied services | Level 1 |  |  |
| Responsibilities of VTS personnel | Level 3 |  |  |
| **Log keeping and record keeping** |  |  |  |
| Objectives and Requirements of log keeping and record keeping | Level 1 |  |  |
|  |  | Total 10 hours | Total 8 hours |

* + 1. DETAILED COMPETENCE TABLE OF MODULE 2 – Legal Framework

1. Competence Table – Legal Framework

| Element | *Session Objective* | Sub-element | Subject Elements | Level of Competence |
| --- | --- | --- | --- | --- |
| **2.1** | **Regulatory Framework** |  |  |  |
| **2.1.1** | *List the maritime organisations related to VTS, maritime operations and protection of the environment.* | 2.1.1.1 | UN Organisations (IMO, ITU) | 2 |
| 2.1.1.2 | Intergovernmental Organisations (IGOs), Non-Governmental Organisations (NGOs) including IALA, IHO, ISO and IEC | 2 |
| 2.1.1.3 | IALA Standards, recommendations and guidelines | 2 |
| **2.1.2** | *Explain the legislative requirements relating to VTS.* | 2.1.2.1 | IMO Conventions, Resolutions and Circulars related to VTS (including SOLAS Chapter V, Reg. 12, IMO Res A1158(32)) | 3 |
| 2.1.2.2 | IALA Standards, recommendations and guidelines | 3 |
| **2.1.3** | *Explain the regulatory and legal framework relating to operations in the VTS area.* | 2.1.3.1 | National regulations related to VTS | 3 |
| 2.1.3.2 | Local regulations and byelaws related to VTS | 3 |
| **2.1.4** | *Identify legislative requirements relating to maritime operations and protection of the environment.* | 2.1.4.1 | United Nations / UNCLOS (innocent passage, areas and zones) | 1 |
| 2.1.4.2 | IMO Conventions, Resolutions and Circulars (other – including SOLAS V-10, 11, 13; MARPOL, SAR, FAL, IMDG, MARPOL) | 1 |
| 2.1.4.3 | Recommendations and standards (ITU, IEC) | 1 |
|  |  |  |
| **2.1.5** | *Identify how maritime information may be promulgated.* | 2.1.5.1 | Notices to mariners, Admiralty List of Radio Signals | 1 |
| 2.1.5.2 | Other means (websites, etc.) | 1 |
| **2.2** | **Legal Liabilities** |  |  |  |
| **2.2.1** | *Explain the legal liabilities related to VTS functions.* | 2.2.1.1 | Extent of authority and responsibility for Competent Authority, VTS Provider | 3 |
| 2.2.1.2 | Extent of authority and responsibility for VTS Personnel:   * Routine operations * Incidents / emergency response * Accuracy of information promulgated * Requirements and limitations of authority | 3 |
| 2.2.1.2 | Concept of civil, administrative and criminal aspects. | 2 |
| **2.3** | **Roles and Responsibilities** |  |  |  |
| **2.3.1** | *Identify the roles, responsibilities of and relationships between ship masters, marine pilots, VTS and allied services.* | 2.3.1.1 | Roles and responsibilities of VTS, master and pilot | 1 |
| 2.3.1.2 | Relationshipbetween VTS, master and pilot | 1 |
| 2.3.1.3 | Interactions with Allied services | 1 |
| **2.3.2** | *Explain the responsibilities of VTS personnel* | 2.3.2.1 | Role and responsibility of VTS personnel in the provision of VTS | 3 |
| 2.3.2.2 | Monitoring compliance and enforcement of regulatory provisions for which they are empowered | 3 |
| **2.4** | **Log Keeping and Record Keeping** |  |  |  |
| **2.4.1** | *Identify the objectives and requirements for log keeping and recording in VTS* | 2.4.1.1 | Methods and principles of log keeping; retention of logs | 1 |
| 2.4.1.2 | Reporting of incidents, casualty and near miss including:   * the role of VTS: * collection of data, * statement and report writing. | 1 |

1. PROVISION OF VTS

This module is being developed.

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1. NAUTICAL KNOWLEDGE

# SUBJECT FRAMEWORK

## Scope

This module covers nautical knowledge elements required to perform the function of a VTS Operator.

## Objectives of Module 4

On completion of the module, the student will apply concepts related to nautical knowledge, including:

* collision regulations
* aids to navigation and the maritime buoyage system
* knowledge of port operations
* shipboard knowledge such as ship handling, navigational equipment and bridge procedures
* nautical concepts
* processes involved with voyage/passage planning, and
* the effect of tides, tidal streams and currents.

## Suggested Training aids and exercises

The teaching methods for that are suggested for use in the delivery of this module include:

* Classroom presentations and facilitated discussion
* Case studies and activities
* Simulation
* E-learning
* [to be developed]

## References relevant to this module

The following references are relevant to the planning and delivery of this module:

[to be developed…]

* 1. SUBJECT OUTLINE OF MODULE 4

1. Subject outline – Nautical knowledge

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| Chartwork  Chart information and terminology  Plotting positions  Course/speed/distance/time calculations  True and magnetic courses  Passage planning  Tides and tidal streams  Updating charts and publications | Level 1 |  |  | |
| Collision regulations  International Regulations for Preventing Collisions at Sea (COLREGS) | Level 3 |  |  | |
| Aids to Navigation  International Maritime Buoyage  Radar beacons  Satellite and differential satellite position fixing  Terrestrial position fixing systems  Virtual aids to navigation | Level 2 |  |  | |
| Navigational Aids (Shipborne)  Radar  Gyro and magnetic compasses  Other navigational aids | Level 2 |  |  | |
| Shipboard Knowledge  Ship terminology - Technical  Ship terminology - Nautical phrases  Types of vessels  Types of cargo  Ship stability  Propulsion systems  External forces  Vessel bridge procedures | Level 2 |  |  | |
| Port Operations and other allied services  Pilotage operations  Port operations, including contingency plans  Security  Tugs and towing  Ships agents | Level 3 |  |  | |
|  |  | Total 85 hours | Total 38 hours | |

* 1. DETAILED competence table OF MODULE 4 – Nautical Knowledge

1. Competence Table – Nautical Knowledge

| Element | *Session Objective* | Sub-element | Subject Elements | Level of Competence |
| --- | --- | --- | --- | --- |
| **4.1** | **Nautical Concepts** |  |  |  |
| **4.1.1** | *Define terms and acronyms related to charts.* | 4.1.1.1 | Chart projections (including Mercator, polyconic, gnomonic) | 1 |
| 4.1.1.2 | Finding positions on the globe – latitude, longitude | 1 |
| 4.1.1.3 | Routes and courses – great circle, rumb line | 1 |
| 4.1.1.4 | Chart types (paper, raster, vector) | 1 |
| 4.1.1.5 | Electronic Navigation Chart (ENC), Electronic Chart Display and Information Systems (ECDIS) | 1 |
| 4.1.1.6 | Updating charts and publications:   * Notices to Mariners * Temporary and Preliminary corrections (T & Ps) | 1 |
| **4.1.2** | *Describe positioning of ships on charts.* | 4.1.2.1 | Provision and representation of positions on charts (paper, ECDIS) | 1 |
| 4.1.2.2 | Measuring distances on charts | 1 |
| 4.1.2.3 | Lines of position (LOPs) (bearings, ranges) | 1 |
| **4.1.3** | *Apply speed/distance/time calculations* | 4.1.3.1 | Overview of speed/distance/time formula (S x T = D) | 3 |
| 4.1.3.2 | Simple scenarios | 3 |
| 4.1.3.3 | Complex scenarios | 3 |
| **4.1.4** | *Describe theory and practice of compass corrections.* | 4.1.4.1 | Gyro and magnetic compass | 1 |
| 4.1.4.2 | Compass directions | 1 |
| 4.1.4.3 | Variation, deviation, compass error | 1 |
| 4.1.4.4 | Course made good vs course to steer | 1 |
| 4.1.4.5 | Responding to developing unsafe situations – provision of course to make good (realistic, true) |  |
| **4.2** | **Voyage (Passage) Planning** |  |  |  |
| **4.2.1** | *Describe the process of voyage planning (passage planning)* | 4.2.1.1 | Requirement for the ship to create a berth to berth voyage plan (IMO A.893(21); A.999(25)) | 1 |
| 4.2.1.2 | The four elements of a voyage plan (appraisal, planning, execution, monitoring) | 1 |
| 4.2.1.3 | Information to support passage plan | 1 |
|  |  |  |
| 4.2.1.4 | Contingency planning (by the ship) | 1 |
| **4.3** | **Tides, Tidal Streams and Currents** |  |  |  |
| **4.3.1** | *Define terms related to tides and tidal streams* | 4.3.1.1 | Introduction to tides and tidal stream | 1 |
| 4.3.1.2 | terms relating to tides and tidal streams   * Chart datum * Spring/neap tides * Ebb/flow/slack/eddies * Set/drift/rate * Diurnal/semi-diurnal | 1 |
| **4.3.2** | *Interpret tide and current tables* | 4.3.2.1 | Information contained in tide tables | 2 |
| 4.3.2.2 | Reading tide tables and current tables | 2 |
| 4.3.2.3 | Intermediate heights and times | 2 |
| 4.3.2.4 | Primary and secondary ports | 2 |
| **4.3.3** | *Explain the effect of tides, tidal streams and currents on vessel movements in the VTS area.* | 4.3.3.1 | Estimated position (EP) and Dead Reckoning (DR) | 3 |
| 4.3.3.2 | Effect of tides, tidal streams and ship positions | 3 |
| 4.3.3.3 | Effect of wind/leeway | 3 |
| **4.4** | **Collision Regulations** |  |  |  |
| **4.4.1** | *Describe the international Regulations for Preventing Collisions as Sea (COLREGS)* | 4.4.1.1 | Overview of COLREGS (Part A, B, C, D, E, F) ( | 1 |
| 4.4.1.2 | Part A – General | 1 |
| 4.4.1.3 | International distress signals (annex IV to the COLREGS) | 1 |
| 4.4.1.4 | Enforcement of COLREGS | 1 |
| **4.4.2** | *Interpret COLREGS within a VTS area* | 4.4.2.1 | Part B – Steering and sailing rules | 2 |
| 4.4.2.2 | Conduct of vessel in specific conditions   * Reduced visibility * Narrow channels * Traffic separation schemes | 2 |
|  |  |  |  |  |
|  |  |  |  |  |
| **4.5** | **Aids to Navigation** |  |  |  |
| **4.5.1** | *Explain the role of aids to navigation and the IALA International Maritime Buoyage System (MBS) in safe navigation* | 4.5.1.1 | Regulations pertaining to buoyage systems | 3 |
| 4.5.1.2 | Types of AtoN   * Physical * Virtual | 3 |
| 4.5.1.3 | Introduction to the International Maritime Buoyage System   * Lateral systems (IALA A & B) * Cardinal systems * Special AtoN * Implications of different systems * RACONS | 3 |
| 4.5.1.4 | Characteristics of floating aids and Mobile AtoN (MAtoN)   * Placement of buoys * Fundamental rules for safe navigation * Chart symbols and abbreviations * Numbering of AtoN | 3 |
| 4.5.1.5 | Characteristics of fixed aids   * Day beacons * Light stations * Ranges * Sector lights * Leading lights * Fog signals | 3 |
| 4.5.1.6 | Characteristics of Virtual AtoN, types and uses | 3 |
| **4.6** | **Position, Navigation and Timing (PNT)** |  |  |  |
| **4.6.1** | *Describe the role of position, navigation, and timing (PNT) in safe, efficient and pollution free transits.* | 4.6.1.1 | Introduction to global navigation satellite systems (GNSS)   * Purpose of GNSS * Types of GNSS | 1 |
| 4.6.1.2 | Implications to VTS   * Benefits and Limitations | 1 |
| **4.7** | **Navigational equipment (shipborne)** |  |  |  |
| **4.7.1** | *Describe the use of different navigational equipment used onboard ships.* | 4.7.1.1 | Navigational equipment, benefits and limitations   * Radar / ARPA * AIS * Compass (gyro, magnetic) * Echo sounders * ECDIS | 2 |
| 4.7.1.2 | Regulatory framework for carriage of equipment | 2 |
| **4.8** | **Shipboard Knowledge** |  |  |  |
| **4.8.1** | *Define terms related to ships, shipping, and cargo* | 4.8.1.1 | Parts of a ship   * General (bow, stern, etc.) * Dimensions (Length overall, length between perpendiculars, beam, draft) * Loadlines and draft marks | 1 |
| 4.8.1.2 | Nautical terminology   * Directions/relative bearings * Numbers * Mooring / anchoring terms * Mooring lines | 1 |
| **4.8.2** | *Identify types of vessels and cargos* | 4.8.2.1 | Types of vessels including   * General cargo ships * Tankers * Bulk carriers * Combination carriers * Container ships * Passenger ships * Ro-ro ships * Fishing vessels * Offshore vessels | 1 |
| 4.8.2.2 | Other vessels including   * Rigs * Offshore supply * Offshore tugs * Tugs * Pilot boats * SAR vessels * Seaplanes * WIG * MASS * Vessels operated by allied services | 1 |
| 4.8.2.3 | Cargo, including   * General cargo * Palletized cargo * Container cargo * Bulk cargo * Bulk cargo – liquid | 1 |
| **4.8.3** | *Identify different types of propulsion systems for ships* | 4.8.3.1 | Common systems   * Fuel Oil, Diesel, diesel electric * Gas turbine * Steam | 1 |
| 4.8.3.2 | Developing systems / Alternative energy | 1 |
| **4.8.4** | *List considerations for carriage of dangerous goods* | 4.8.4.1 | International Maritime Dangerous Goods Code (IMDG) | 1 |
| 4.8.4.2 | Implications for movements in the VTS area | 1 |
| **4.9** | **Ship handling** |  |  |  |
| **4.9.1** | *Explain factors influencing ship movement and stability* | 4.9.1.1 | Ship movements / six motions | 3 |
| 4.9.1.2 | Introduction to ship stability   * Definitions of heel, list and trim * Factors influencing ship stability * Dangerous situations regarding ship stability | 3 |
| **4.9.2** | *Describe factors affecting ship handling* | 4.9.2.1 | Overview of theory and practice of ship handling   * Effect of pivot point on ship handling * Line of approach * Stopping characteristics * Turning characteristics | 2 |
| 4.9.2.2 | External forces on shiphandling   * Winds * Tides * Ship-ship interaction * Bank suction * Squat | 2 |
| 4.9.2.3 | Factors affecting manoeuvrability   * Types of rudders * Types of propellers * Thrusters * Use of tugs | 2 |
| **4.9.3** | *Describe the effect of meteorology and hydrographic factors on vessels* | 4.9.3.1 | Meteorological elements – effect of:   * Wind on safety of waterway and ship manoeuvrability * Reduced visibility on safety of waterway * High and low pressure systems on water height, depth | 2 |
| 4.9.3.2 | Hydrographic factors   * Effect of tides and current on safety of waterway and ship manoeuvrability * Planning waterway movements taking into account tides and currents | 2 |
| **4.10** | **Bridge Procedures** |  |  |  |
| **4.10.1** | *Describe vessel bridge procedures* | 4.10.1.1 | Maintaining a navigational watch   * Under routine circumstances * In pilotage waters * In non-pilotage restricted waters * Bridge Resource Management | 2 |
| 4.10.1.2 | Vessel response to emergencies in a VTS area   * Regulations governing transit of vessels with regard to special circumstances * Expected actions on board vessels during special circumstances | 2 |
| 4.10.1.3 | Bridge operations (arrival & departure)   * Berthing and unberthing * Anchoring | 2 |
| **4.11** | **Port Operations and allied services** |  |  |  |
| **4.11.1** | *Describe port operations* | 4.11.1.1 | * Overview of port operations | 2 |
| 4.11.1.2 | Overview of pilotage operations   * Responsibilities of pilots * Master/pilot/VTS relationship | 2 |
| 4.11.1.3 | Overview of allied services in the port | 2 |
|  |  | 4.11.1.4 | Overview of ISPS Code and security levels | 2 |
|  |  |  |  |  |
|  |  |  |  |  |

1. EQUIPMENT

# SUBJECT FRAMEWORK

## Scope

This module covers the requirement for VTS Operators to be able to understand the operational limitations and benefits of equipment used in VTS

## Objectives of Module 5

On completion of the module the student will use VTS equipment to address the purpose of VTS.

## Suggested Training aids and exercises

The teaching methods for that are suggested for use in the delivery of this module include:

* Classroom presentations and facilitated discussion
* Case studies and activities
* Simulation
* E-learning
* [to be developed]

## References relevant to this module

The following references are relevant to the planning and delivery of this module:

[to be developed…]

* 1. SUBJECT OUTLINE OF MODULE 5

1. Subject outline - Equipment

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| Operational benefits / limitations | 2 |  |  |
| Fundamentals of Radar theory | 3 |  |  |
| VHF Radio | 2 |  |  |
| Automatic Identification System | 2 |  |  |
| Imaging systems | 2 |  |  |
| Hydrographic and Meteorological sensors | 2 |  |  |
| Principles of DST | 2 |  |  |
| Use of DST | 4 |  |  |
| Importance of equipment performance monitoring | 1 |  |  |
| Impact on VTS | 1 |  |  |
|  |  | Total 39 +4 hours | Total 6 + 11 hours |

* 1. DETAILED competence table OF MODULE 5 – Equipment

1. Competence Table – Equipment

| Element | *Session Objective* | Sub-element | Subject Elements | Level of Competence |
| --- | --- | --- | --- | --- |
| **5.1** | **Sensors in VTS** |  |  |  |
| **5.1.1** | *Describe the operational benefits and limitations of sensors in VTS* | 5.1.1.1 | Sensors to support monitoring and management of ship traffic - Radar, radio, AIS, CCTV | 2 |
| 5.1.1.2 | Sensors related to the VTS environment – meteorology, hydrographic sensors | 2 |
| 5.1.1.3 | Recording / replay equipment for sensor data | 1 |
| **5.1.2** | *Explain the fundamentals of radar theory.* | 5.1.2.1 | Principles of radar theory | 1 |
| 5.1.2.2 | Application of radar for VTS | 3 |
| 5.1.2.3 | Features of generic VTS radar display:   * Detection, acquisition and tracking * Difference in radar bands (X, S, etc) | 3 |
| 5.1.2.4 | Alerts and warnings in radar | 3 |
| 5.1.2.5 | Limitations:   * Factors affecting radar detection * Factors affecting radar interpretation | 3 |
| **5.1.3** | *Describe the operation of VHF Radio in VTS.* | 5.1.3.1 | Frequencies in the international VHF maritime mobile band | 2 |
| 5.1.3.2 | Restrictions on the use of Radio Regulations (RR) Appendix 18 frequencies | 2 |
| 5.1.3.3 | Principles of VHF operation:   * Channel spacing * channel saturation | 1 |
| 5.1.3.4 | VHF benefits / limitations (including interference and range) | 2 |
| 5.1.3.5 | Operation of radio equipment:   * General Communications – working frequencies, Simplex, Duplex * Safety, Urgency and Distress | 2 |
| 5.1.3.6 | Digital Selective Calling (DSC) | 1 |
| 5.1.3.7 | VHF Radio Direction Finder (VHF RDF) | 1 |
|  |  |  |
| **5.1.4** | *Describe the use of the Automatic Identification System (AIS) in VTS* | 5.1.4.1 | Introduction to AIS, including Satellite AIS | 2 |
| 5.1.4.2 | Modes of operation of AIS   * AIS units * AIS messages | 2 |
| 5.1.4.3 | Benefits and limitations of AIS | 2 |
| **5.1.5** | *Describe the use of imaging systems in VTS* | 5.1.5.1 | Overview of:   * Close circuit TV (CCTV) * Low Light TV (LLTV) * Infra-red CCTV | 2 |
| **5.1.6** | *Describe the use of environmental sensors in VTS* | 5.1.6.1 | Hydrographic sensors:   * Tide gauges / remote height of tide indicators * Tidal stream indicator – remote indications * Data from wave monitoring sites | 2 |
| 5.1.6.2 | Meteorological sensors   * Barometer * Temperature/humidity indicators * Anemometers (wind measurement) * Visibility sensors | 2 |
| **5.2** | **Decision Support Tool** |  |  |  |
| **5.2.1** | *Explain the principles of DST in VTS* | 5.2.1.1 | General Principles of DST | 3 |
| 5.2.1.2 | Types of DST (long-term (planning); near real-time; real-time) | 3 |
| 5.2.1.3 | Integration of data from different sources (data fusion) | 3 |
| 5.2.1.4 | Alerts and alarms | 3 |
| 5.2.1.5 | Benefits / limitations | 3 |
| **5.2.2** | *Use Decision Support Tools in VTS.* | 5.2.2.1 | Providing relevant and timely information | 4 |
| 5.2.2.2 | Monitoring and managing vessel traffic | 4 |
| 5.2.2.3 | Responding to developing unsafe situations | 4 |
| **5.3** | **Equipment Performance Monitoring** |  |  |  |
| **5.3.1** | *Identify the importance of equipment performance monitoring* | 5.3.1.1 | Expected normal operating parameters | 1 |
| 5.3.1.3 | Reporting outages | 1 |
| **5.4** | **Evolving Technologies** |  |  |  |
| **5.4.1** | *Describe the impact of developing and evolving technologies on VTS* | 5.4.1.1 | Digital developments | 1 |
| 5.4.1.2 | Operational developments | 1 |
| 5.4.1.3 | Other developments | 1 |

1. PERSONAL ATTRIBUTES
   1. SUBJECT FRAMEWORK
      1. Scope

This module addresses the requirement for VTS Operators to perform their duties under all conditions including emergencies and stressful situations. It is recommended that the contents of this module be presented to the trainees in the early stages of the course.

* + 1. Objectives of Module 6

On completion of the module the student will demonstrate personal attributes suitable to conduct their duties in a manner that supports a healthy work environment in VTS.

## Suggested Training aids and exercises

The teaching methods for that are suggested for use in the delivery of this module include:

* Classroom presentations and facilitated discussion
* Case studies and activities
* Simulation
* E-learning
* [to be developed]

## References relevant to this module

The following references are relevant to the planning and delivery of this module:

[to be developed…]

* 1. SUBJECT OUTLINE OF MODULE 6

1. Subject outline – Personal attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| Teamwork |  |  |  |
| Theory of teamwork | 2 |  |  |
| Teamworking skills | 2 |  |  |
| Responsibility and reliability |  |  |  |
| Responsibility and reliability in VTS | 4 |  |  |
| Fatigue Management and shiftwork |  |  |  |
| Fatigue and stress in VTS working environment | 2 |  |  |
|  |  | Total 6 hours | Total 4 hours |

* 1. DETAILED competence table OF MODULE 6 – Personal attributes

1. Competence Table – Personal Attributes

| Element | *Session Objective* | Sub-element | Subject Elements | Level of Competence |
| --- | --- | --- | --- | --- |
| **6.1** | **Teamwork** |  |  |  |
| **6.1.1** | *Describe the theory of teamwork.* | 6.1.1.1 | Characteristics of leaders and followers | 2 |
| 6.1.1.2 | Adaptability, Flexibility, Assertiveness, Diplomacy | 2 |
| 6.1.1.3 | Decision making:   * Taking initiative * Prioritising tasks * Thinking critically * Communicating with team members | 2 |
| 6.1.1.4 | Conflict resolution / negotiation   * Identifying methods of conflict resolution * When and how to intervene | 2 |
|  | [other?] |  |
| **6.1.2** | *Demonstrate teamwork skills in support of VTS operations.* | 6.1.2.1 | Working relationship within the VTS team | 3 |
| 6.1.2.2 | Working relationship within the VTS | 3 |
| 6.1.2.3 | Working relationship with VTS and port team (ships, pilots, tugs) | 3 |
|  |  | 6.1.2.4 | Working relationship with VTS and allied services | **1** |
| **6.2** | **Responsibility and Reliability** |  |  |  |
| **6.2.1** | *Explain the importance of responsibility and reliability in VTS.* | 6.2.1.1 | Personal Safety and safety of others | 4 |
| 6.2.1.2 | Responsibility for actions including:   * attention to detail * respect * attitude * reliability | 4 |
|  |  |  |
| **6.3** | **Fatigue management and shiftwork** |  |  |  |
| **6.3.1** | *Describe strategies to address fatigue and stress related in the VTS working environment.* | 6.3.1.1 | Workplace health and safety   * Physical safety * Psychological safety * Implications of shift work environment | 2 |
| 6.3.1.2 | Stress and Fatigue   * Causes of stress and fatigue * Strategies to address stress and fatigue | 2 |
| 6.3.1.3 | Dealing with traumatic experiences | 2 |
| 6.3.1.4 | Healthy work/life balance with shift work | 2 |
|  | *[other]* |  |  |  |