**IALA Model Course**

V-103/1

Vessel Traffic Services Operator Training

This version incorporates the comments from the intersessional meeting held 16 December 2020

Comments on the revised modules and contents welcomed for incorporation prior to the next intersessional meeting, proposed to be held 4 Feb at 0900 UTC (2000 AEDT)

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.

|  |  |  |
| --- | --- | --- |
| 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 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

PART A COURSE OVERVIEW 9

1. INTRODUCTION 9

2. DOCUMENT PURPOSE 9

3. COURSE OBJECTIVE 9

4. COURSE PRE-REQUISTES 10

5. COURSE OUTLINE 10

6. SPECIFIC COURSE RELATED TEACHING AIDS AND NOTES 11

6.1. General 11

6.2. Developing the Curriculum 12

6.3. Competence Charts 12

6.4. Teaching aids and references 14

6.5. Course currency and evaluation 14

7. PRE-COURSE READING MATERIAL 14

8. ASSESSMENT 14

9. CERTIFICATION 15

PART B COURSE OVERVIEW 16

MODULE 1 - REGULATORY AND LEGAL FRAMEWORK 16

1. SCOPE 16

2. LEARNING OBJECTIVE 16

3. RECOMMENDED TRAINING HOURS 16

4. RECOMMENDED TRAINING AIDS AND EXERCISES 16

5. PRE-COURSE READING MATERIAL 16

6. DETAILED TEACHING SYLLABUS 17

7. REFERENCES REVELANT TO THIS MODULE 18

8. VTS OPERATOR COMPETENCE CHART 19

MODULE 2 – COMMUNICATION ~~COORDINATION~~ AND INTERACTION 20

1. SCOPE 20

2. LEARNING OBJECTIVE 20

3. RECOMMENDED TRAINING HOURS 20

4. RECOMMENDED TRAINING AIDS AND EXERCISES 20

5. PRE-COURSE READING MATERIAL 20

6. DETAILED TEACHING SYLLABUS 21

7. REFERENCES REVELANT TO THIS MODULE 23

8. VTS OPERATOR COMPETENCE CHART 23

MODULE 3 – PROVISION OF VTS 24

1. SCOPE 24

2. LEARNING OBJECTIVE 24

3. RECOMMENDED TRAINING HOURS 24

4. RECOMMENDED TRAINING AIDS AND EXERCISES 24

5. PRE-COURSE READING MATERIAL 24

6. DETAILED TEACHING SYLLABUS 25

7. REFERENCES REVELANT TO THIS MODULE 33

8. VTS OPERATOR COMPETENCE CHART 33

MODULE 4 – NAUTICAL KNOWLEDGE 34

1. SCOPE 34

2. LEARNING OBJECTIVE 34

3. RECOMMENDED TRAINING HOURS 34

4. RECOMMENDED TRAINING AIDS AND EXERCISES 34

5. PRE-COURSE READING MATERIAL 34

6. DETAILED TEACHING SYLLABUS 35

7. REFERENCES REVELANT TO THIS MODULE 39

8. VTS OPERATOR COMPETENCE CHART 40

MODULE 5 - VTS EQUIPMENT 41

1. SCOPE 41

2. LEARNING OBJECTIVE 41

3. RECOMMENDED TRAINING HOURS 41

4. RECOMMENDED TRAINING AIDS AND EXERCISES 41

5. PRE-COURSE READING MATERIAL 41

6. DETAILED TEACHING SYLLABUS 42

7. REFERENCES REVELANT TO THIS MODULE 44

8. VTS OPERATOR COMPETENCE CHART 44

MODULE 6 – PERSONAL ATTRIBUTES 45

1. SCOPE 45

2. LEARNING OBJECTIVE 45

3. RECOMMENDED TRAINING HOURS 45

4. RECOMMENDED TRAINING AIDS AND EXERCISES 45

5. PRE-COURSE READING MATERIAL 45

6. DETAILED TEACHING SYLLABUS 46

7. REFERENCES REVELANT TO THIS MODULE 47

8. VTS OPERATOR COMPETENCE CHART 47

ANNEX 1 EXISTING TEXT CURRENTLY PRESENT IN THE MODEL COURSE 48

9. ACRONYMS 48

PART C DELIVERY OF THE MODEL COURSE 50

1. INTRODUCTION 50

2. COURSE MODULES 50

3. SUBJECT OUTLINE 50

4. DETAILED TEACHING SYLLABUS 51

5. PRESENTATION 51

6. EVALUATION OR ASSESSMENT OF THE COURSE PARTICIPANTS 51

7. IMPLEMENTATION 51

8. VALIDATION 51

PART D COURSE FRAMEWORK 52

1. INTRODUCTION 52

2. REQUIREMENTS FOR ATTAINING THE COURSE CERTIFICATE 52

3. COURSE INTAKE – LIMITATIONS 52

4. TRAINING STAFF REQUIREMENTS 52

4.1. Course instructors 52

4.2. Course Assessors 53

5. TEACHING FACILITIES AND EQUIPMENT 53

PART E GUIDELINES FOR INSTRUCTORS 54

1. INTRODUCTION 54

2. CURRICULUM 54

3. LESSON PLANS 55

4. EVALUATION OR ASSESSMENT 56

PART F COURSE MODULES 59

COMMUNICATION CO-ORDINATION AND INTERACTION 62

INTRODUCTION 62

SUBJECT FRAMEWORK 62

SUBJECT OUTLINE OF MODULE 1 63

DETAILED TEACHING SYLLABUS FOR MODULE 1 – Communication Coordination and interaction 65

LEGAL FRAMEWORK 73

INTRODUCTION 73

SUBJECT FRAMEWORK 73

SUBJECT OUTLINE OF MODULE 2 74

DETAILED TEACHING SYLLABUS OF MODULE 2 75

DETAILED TEACHING SYLLABUS OF MODULE 2 76

TRAFFIC MANAGEMENT 78

INTRODUCTION 78

SUBJECT FRAMEWORK 78

SUBJECT OUTLINE OF MODULE 3 79

DETAILED TEACHING SYLLABUS OF MODULE 3 82

NAUTICAL KNOWLEDGE 87

INTRODUCTION 87

SUBJECT FRAMEWORK 87

SUBJECT OUTLINE OF MODULE 4 88

DETAILED TEACHING SYLLABUS OF MODULE 4 89

EQUIPMENT 100

INTRODUCTION 100

SUBJECT FRAMEWORK 100

SUBJECT OUTLINE OF MODULE 5 101

DETAILED TEACHING SYLLABUS OF MODULE 5 103

PERSONAL ATTRIBUTES 120

INTRODUCTION 120

SUBJECT FRAMEWORK 120

SUBJECT OUTLINE OF MODULE 6 121

DETAILED TEACHING SYLLABUS OF MODULE 6 122

EMERGENCY SITUATIONS 124

INTRODUCTION 124

SUBJECT FRAMEWORK 124

SUBJECT OUTLINE OF MODULE 7 125

DETAILED TEACHING SYLLABUS OF MODULE 7 126

ANNEX 2 VTS Operator Competence chart 129

ANNEX 3 Teaching aids and references 137

ANNEX 4 Example of English Language Tests 141

List of Tables

Table 1 Levels of Competence 56

Table 2 Assessment Levels 57

Table 3 Simulation Exercises 58

Table 4 Recommended Course Hours 60

Table 5 Subject outline – Language 63

Table 6 Detailed Teaching Syllabus – Language 65

Table 7 Subject outline – Traffic management **Error! Bookmark not defined.**

Table 8 Detailed teaching syllabus – Traffic management 82

Table 9 Subject outline - Equipment 101

Table 10 Detailed teaching syllabus – Equipment 103

Table 11 Subject outline – Nautical knowledge 88

Table 12 Detailed teaching syllabus – Nautical knowledge 89

Table 13 Subject outline – Communication co-ordination 110

Table 14 Detailed teaching syllabus – Communication co-ordination 111

Table 15 Subject outline – VHF radio 117

Table 16 Detailed teaching syllabus – VHF radio 118

Table 17 Subject outline – Personal attributes 121

Table 18 Detailed teaching syllabus – Personal attributes 122

Table 19 Subject outline – Emergency situations 125

Table 20 Detailed teaching syllabus – Emergency situations 126

1. 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.857(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 and Approval Process for VTS Training** sets out the process by which a training organisation can be accredited to deliver approved VTS training courses.

# DOCUMENT PURPOSE

This document defines the level of training and knowledge needed to reach levels of competence defined by IALA to obtaining a V103/1 certificate.

This model course is to be used by accredited training organisations in preparing their V103/1 curriculums.

# COURSE OBJECTIVE

Upon successful completion of this course the student should have demonstrated the requisite knowledge, understanding and proficiency to undertake the duties associated with the provision of VTS 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.857(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 PRE-REQUISTES

All students attending the course are required to hold appropriate national qualifications to operate the VHF marine radiotelephony equipment for the coastal stations they operate. For example, at a minimum this should be a radio/restricted operators certificate, or may be to a higher standard with GDMSS qualifications depending on the radio equipment used. [Is there an international name for the course/s?]

The student should be able to achieve the equivalent of the International English Language Testing System (IETS) level 5. Refer to Annex 3 for more information. Where this level of English cannot be achieved, the training organisation should identify how the student may achieve this, for example, a suitable bridging course.

Consideration should also be given to the recognition of prior learning, which may reduce formal training time for a student.

|  |
| --- |
| *IALA Guideline 1017 - Assessment of Training for VTS* provides further guidance on the assessment and recognition of prior learning. |

The training organisation should specify any additional entry standards that may be required for the course. For example, a student may have already completed some or all of their V-103/3 VTS On-the-Job training prior to attending the V103/1 VTS operator course.

# COURSE OUTLINE

The course comprises of 6 modules that a VTS operator needs to have knowledge in, and understanding of to undertake the duties associated with the provision of VTS. Simulated exercises and assessments undertaken during the course are intended to represent events / incidents that may be experienced at a VTS.

Each module identifies the total recommended number of hours that should be allotted, however, it should be appreciated that these allocations are arbitrary and assume that the students met the entry requirements for each subject.

The recommended duration in hours does not include the time necessary for competency assessments. Further, the instructor should allow an adequate period of time during the course for revision of course content.

1. Teaching Modules

| Module Title | Time in Hours | | Overview |
| --- | --- | --- | --- |
| Lectures / Presentations | Exercises / Simulations |
| REGULATORY AND LEGAL FRAMEWORK |  |  | This module describes the regulatory and legislative framework of establishing a VTS, including the liabilities and the responsibilities of various parties involved with VTS. |
| COMMUNICATION ~~COORDINATION~~ AND INTERACTION |  |  | This module describes communications techniques and encourages the use of standard VTS phraseology when communicating with vessels and allied services to:   * + - Facilitate clear, concise, and unambiguous communications that are timely and effective.     - Minimise misunderstanding of the intent of messages and reducing the time required for effective communication. * Mitigate complacency with more experienced operators, as well as a valuable coaching tool for new VTS personnel. |
| PROVISION OF VTS |  |  | This module describes the subject areas, knowledge and practical competence to interact with participating ships and allied services in mitigating the development of unsafe situations through:   * The provision of timely and relevant information on factors that may influence the ship's movements and assist on-board decision making. * The management of ship traffic to ensure the safety and efficiency of ship movements. * Responding to developing unsafe situations |
| NAUTICAL KNOWLEDGE |  |  | This module describes the essential elements of nautical knowledge that a VTS operator requires to understand and apply within the VTS area. Key elements covered include:   * collision regulations, * buoyage and electronic aids to navigation systems, * ship stability and handling, * bridge operations and shipboard equipment, * chartwork, and * the effect of tides and tidal streams. |
| VTS EQUIPMENT |  |  | This module describes the basic theory and the limitations of key equipment currently used in VTS centres. |
| PERSONAL ATTRIBUTES |  |  | This module focuses on the role of a VTS operator, in particular teamwork, the impact of stress and the importance to manage fatigue. |

# SPECIFIC COURSE RELATED TEACHING AIDS AND NOTES

## General

Training courses have traditionally been classroom focussed however with technology advances there is an opportunity to adopt a more blended training approach by integrating online e-learning and remote learning activities. Where the course is classroom based, presentations should be delivered by computer assisted equipment.

Teaching programmes should ensure that all of the listed subject elements are covered as a minimum and that repetition is avoided. Additional national requirements set by the competent authority, or requested by VTS authorities may be introduced. Similarly instructors may identify other subject elements such as new developments or techniques which are appropriate for inclusion in the course syllabus.

All instructors and assessors should be appropriately qualified for the types and levels of training or assessment required for the model course. If this cannot be achieved, then the appropriate expert should cover these subject elements. Every instructor should have access to simulation equipment. ~~In addition, if possible, arrangements should be made for students to visit operational VTS centres~~.

The training organization is to determine the student/staff ratio and number of students enrolled on the course. The class/group size should allow the instructor(s) to give adequate individual attention to course participants as required. For example, where simulator equipment is used, it is recommended that no more than two students are trained simultaneously on any individual piece of equipment.

|  |
| --- |
| ***IALA Guideline 1027 – Simulation in VTS training*** contains information about the design and implementation of VTS exercises using a simulator. |

## Developing the Curriculum

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. For example, differences between the level of skills and competencies of students may be compensated by removing subjects, or reduce the emphasis on, items dealing with knowledge or skills already attained.

When developing lesson plans, the instructor is free to use any teaching method or combination of methods that will ensure students can achieve the required each learning objectives.

The course should be developed based on the detailed syllabus and references/teaching material suggested. The subjects shown in the detailed syllabus are not listed in order of priority and instructors should treat them in the order, which they consider most appropriate to build knowledge for their students.

The detailed teaching syllabus has been written in a learning-objective format where the session objective describes what the student must do to demonstrate that knowledge has been transferred. All session objectives should be prefixed by the words:

*the expected learning outcome is that the trainee has acquired the recommended levels of competence in ….*

Depending on the student intake, the recommended hours may need to be adjusted as neccessary. 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.

An overall teaching programme /timetable should be prepared outlining when subject areas will be covered, practical exercises, assessments etc.

|  |
| --- |
| ? do we need a blue box to cross reference and tell the reader to go look at guidance on how to develop lesson plans etc in G1103 |

## Competence Charts

Competence levels have been phrased to indicate what the student should be capable of doing as a means of demonstrating that the intended level of knowledge or skill has been attained. The VTS Operator competence chart in ANNEX 2 lists the subject modules and how competence can be demonstrated.

To assist in the development of lesson plans, five levels of competence are used in the VTS model courses. Levels 1 to 4 are used in the VTS Operator model course. See Table 2 below.

Each level of competence is defined in terms of the learning outcome, the instructional objectives and the required skills. The recommended level of competence for each subject is indicated in the detailed teaching syllabus of each module.

When determining competence, the assessor should judge whether the student is competent to perform the related tasks, duties and responsibilities using the evaluation criteria contained in column 4 of the VTS Operator competence chart (see ANNEX 2).

1. Levels of Competence

|  |  |  |
| --- | --- | --- |
| Level | Knowledge and/or Attitude | Skill |
| **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 |
| **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 |
| **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 |
| **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 |
| **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 |

## Teaching aids and references

To assist instructors when preparing the course relevant references, recommended teaching aids and suggested exercises have been identified in each course module.

The training materials prepared (eg course notes, course presentations and reference documents etc) should be of a suitable quality and substance to enable the student to complete the course. Where e-learning, distance or blended delivery is proposed, training organizations should consider the necessary adjustments that may be required.

## Course currency and evaluation

The course content should be reviewed for currency before the course commences to ensure that any recent changes to regulations, international guidance and new developments/techniques are reflected in the course.

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.

# PRE-COURSE READING MATERIAL

Some key reference documents have been identified in each module as suggested materials that the student should read prior to attending the course. The instructor should review and adjust as necessary.

# ASSESSMENT

Student progress should be continually assessed and regular reviews undertaken. Any apparent problems should be addressed to ensure the student attains the required levels of competence. Modifications of the teaching scheme should be made where necessary to ensure that students met the course objectives. If necessary, extra tuition should be arranged to enable weaker participants to reach the required standard.

The training organisation needs to determine if a final examination is required, alternatively ongoing course assessments may be used for the purposes of issuing a course certificate. Assessments may take the form of written and/or practical assessments which may be conducted through simulation.

All tasks completed should be recorded by the instructor/assessor, together with any comments which would provide feedback to the student. Records of assessments are to be maintained.

Assessments should use the following five levels to indicate that progressive learning has been attained. It is recommended that, for the VTS Operator, level’s one to four is considered satisfactory.

1. Assessment Levels

|  |  |
| --- | --- |
| Level | Description |
| LEVEL 1 | The participant demonstrates a willingness to learn. |
| LEVEL 2 | The participant demonstrates active participation in the learning process. |
| LEVEL 3 | The training positively influences the participant’s behaviour and attitude, and there is a measurable increase in knowledge and skills. |
| LEVEL 4 | The participant demonstrates the ability to adapt existing knowledge, skills and attitude when dealing with new and unplanned situations. |
| LEVEL 5 | The participant demonstrates a permanent positive change in knowledge, skills and attitude and is ready to positively influence others.  The participant may exhibit some positive changes in co-related behaviours. |

# CERTIFICATION

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

* has achieved the International English Language Testing System (IELTS) level 5, or its equivalent,
* demonstrates they have the theoretical and practical knowledge, and
* has passed the appropriate assessments as outlined in this model course.

1. COURSE MODULES

MODULE 1 - REGULATORY AND LEGAL FRAMEWORK

# SCOPE

This module describes the regulatory and legislative framework of establishing a VTS, including the liabilities and the responsibilities of various parties involved with VTS.

# LEARNING OBJECTIVE

On the completion of the module the student will be able to demonstrate an understanding of, and knowledge in:

* the regulatory and legal framework for establishing VTS
* legal liabilities and their implications to VTS
* the roles and responsibilities of the parties involved in VTS
* the importance of record and log keeping

# RECOMMENDED TRAINING HOURS

The number of recommended hours are XXX.

# RECOMMENDED TRAINING AIDS AND EXERCISES

The teaching methods that should be used for the delivery of this module include:

* Classroom presentations and facilitated discussion
* Case studies
* Guest Speakers, as appropriate

# PRE-COURSE READING MATERIAL

Prior to attending the course, it is suggested that a student be provided with at least the following materials:

* IMO Resolution A.857(XX) XXXX
* IALA Guideline 1071, Establishment of a Vessel Traffic Service beyond territorial seas
* IALA Guideline 1142, XXXX

# DETAILED TEACHING SYLLABUS

| Element | *Session Objective* | Sub-element | Subject Elements | Level of Competence | Resources |
| --- | --- | --- | --- | --- | --- |
| **1.1** | **MARITIME ORGANISATIONS** |  |  |  |  |
|  | *To understand the role of key international/national/local organisations* | 1.1.1 | IMO / IHO / ITU |  | R13, R35 |
| 1.1.2 | IALA |  |
| 1.1.4 | ~~International, national and regional SAR arrangements~~ |  |
| **1.2** | **INTERNATIONAL REGULATIONS** |  |  |  |  |
|  | *Provide an overview to the international regulatory and legal framework for establishing VTS.* | 1.2.1 | SOLAS V/12 – Vessel Traffic Services | L2 | R3 - SOLAS V/12 |
| 1.2.2 | IMO Resolution A.857(20) / the new resolution  Responsibilities of Contracting Governments, Competent Authorities and VTS Authorities | R17 - IMO Resolution A.857(20) |
| 1.2.3 | IALA Standards, Recommendations, and Guidelines | RXX - IALA Standards |
| **1.3** | **NATIONAL REGULATIONS** |  |  |  |  |
|  | *Provide an overview to the national regulatory and legal framework relevant to VTS operations* | 1.3.1 | National legislation | L1 | R35 - National, regional and local legislation and regulations on VTS |
|  |  |  |  |  |  |
| **1.4** | **LEGAL LIABILITY** |  |  |  |  |
|  | *Provide an overview to the legal liabilities and their implications to VTS* | 1.4.1 | Routine operations | L3 |  |
| 1.4.2 | Incidents |  |
| 1.4.3 | Accuracy of information promulgated |  |
| 1.4.4 | Legal responsibilities/ consequence of actions |  |
| 1.4.5 | Requirements and limitations of their authority |  |
| **1.5** | **ROLES AND RESPONSIBILITIES** |  |  |  |  |
|  | *Explain the roles, responsibilities of VTS and the relationships between ship masters, marine pilots, and allied services in a VTS environment.* | 1.5.1 | Ship Masters | L1 |  |
| 1.5.2 | Marine Pilots |  |
| 1.5.3 | Allied Services |  |
| 1.5.4 | Ship Masters to Marine Pilot |  |
|  |  |  |  |  |  |
| **1.6** | **RECORD AND LOG KEEPING** |  |  |  |  |
|  | *To understand the importance of maintaining logs and records* | 1.6.1 | Introduction to log Keeping  ~~Purpose~~  ~~Benefits~~  ~~Difficulties~~ |  |  |
| 1.6.2 | Methods of recording  ~~What information should be recorded~~  ~~Manual records~~  ~~Electronic records (eg Voice, decision support info, radar, CCTV etc)~~ |  |  |
| ~~1.6.3~~ | ~~Accuracy of logs & records~~  ~~Factual~~  ~~Complete~~  ~~Chronological~~  ~~Legible~~  ~~Standardised~~ |  | ? R28, R37, R41, R44 |
| 1.6.4 | Retention of records  ~~Statutory requirements / Legal implications~~  ~~Security of recorded information~~  ~~Use in investigations~~ |  |  |

# REFERENCES REVELANT TO THIS MODULE

The following reference materials are relevant in the planning of this module:

~~R1 SOLAS, Regulation V/10 - Ships’ routeing~~

~~R2 SOLAS, Regulation V/11 - Ship reporting systems~~

R3 SOLAS, Regulation V/12 - Vessel Traffic Services

~~R6 United Nations Convention on the Law of the Sea (UNCLOS)~~

R12 IMO publication on Ships’ Routeing

R16 IMO Assembly resolution A.851(20), General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants

R17 IMO Resolution A.857(XX) Guidelines for Vessel Traffic Services

R35 National, regional and local legislation and regulations on VTS, ports, harbours, pilotage and allied services

R45 IALA Recommendation V-119, Implementation of Vessel Traffic Services

R60 IALA Guideline 1071, Establishment of a Vessel Traffic Service beyond territorial seas

RXX IALA Guideline 1142, XXXX

RXX IALA Standards

# VTS OPERATOR COMPETENCE CHART

On completion of this module, the student should be able to demonstrate the following knowledge, understanding and proficiency.

|  |  |  |
| --- | --- | --- |
| Knowledge, understanding and proficiency | Methods for demonstrating Competence | Criteria for evaluating competence |
|  |  |  |
|  |  |  |

MODULE 2 – COMMUNICATION ~~COORDINATION~~ AND INTERACTION

# SCOPE

This module describes factors involved with communications and encourages the use of standard phraseology when communicating with vessels and allied services to:

* Facilitate clear, concise, and unambiguous communications that are timely and effective.
* Minimise misunderstanding of the intent of messages and reducing the time required for effective communication.
* Mitigate complacency with more experienced operators, as well as a valuable coaching tool for new VTS personnel.

In terms of course pre-requisites, it is assumed that the student has achieved IELTS level 5 or the equivalent, and holds a valid VHF radio operator certificate.

# LEARNING OBJECTIVE

On completion of the module the student will have an appreciation of the communications used in VTS operations including:

* How to provide an good watch handover
* Understanding various factors of how to be a more effective communicator
* Standard phrases for communicating with vessels and allied services
* The concepts of how to compile, deliver and interpret messages

# RECOMMENDED TRAINING HOURS

The number of recommended hours are XXX.

# RECOMMENDED TRAINING AIDS AND EXERCISES

The teaching methods that should be used for the delivery of this module include:

* Classroom presentations and facilitated discussion
* Simulation exercises should focus on communications and use of VTS phraseology

# PRE-COURSE READING MATERIAL

Prior to attending the course, it is suggested that a student be provided with at least the following materials:

* GL1132 on VTS voice communications and phraseology
* ? SMCP

# DETAILED TEACHING SYLLABUS

| Element | Session Objective | Sub-element | Subject Elements | Level of Competence | Resources |
| --- | --- | --- | --- | --- | --- |
| **2.1** | **PRINCIPLES OF A GOOD WATCH HANDOVER** |  |  |  |  |
|  | *To understand the principles of how to provide a good handover* | 2.1.1 | XXXX. Suggest subject elements are selected from the IALA training workshop output (June 2020) |  |  |
| **2.2** | **COMMUNCIATION FACTORS** |  |  | **L3** |  |
|  | *To understand how to be a more effective communicator by using various communication factors* | 2.2.1 | Interpersonal communications  Establishing internal and external working relationships  Port Resource management (VTS/Pilot/Master) |  |  |
| 2.2.2 | Conflict resolution/ negotiation  Identify methods of conflict resolution  When and how to intervene |  |  |
| 2.2.3 | Barriers to Effective communication  Language differences, both cultural and regionally  Alternative meanings of words  Methods to address the barriers |  |  |
| **2.3** | **VTS COMMUNICATION PHRASES** |  |  |  |  |
|  |  | 2.3.1 | Use of standard phraseology  Use of standard phrases to trigger predictable actions  Limiting the number of standard phrases to ensure recognition and memory retention  When standard phrases are not the best method available |  |  |
| 2.3.1 | SMCP  Introduction to the SMCP – General layout and origins  Use of SMCP on ships, particularly during emergency situations and distress  When and how to use the SMCP in response to ships using SMCP |  | **?R19** |
| 2.3.3 | Message Markers  Describe the use and purpose |  | ? R19 (VTS section), R13 |
| 2.3.4 | VTS Phraseology |  |  |
| **2.4** | **COMPILING A MESSAGE** |  |  |  | **G1132** |
|  | *To demonstrate the use compiling a message in terms of message structure, timing and content.* | 2.4.1 | Message Structure |  |  |
| 2.4.2 | Procedures for making distress, urgency, safety calls |  |  |
| **2.5** | **DELIVERING A MESSAGE** |  |  |  | **G1132** |
|  | *To demonstrate the techniques used when delivering a message.* | 2.5.1 | Questioning Techniques  Direct questioning using message markers  Linguistic problems in using voice tone to pose a question  Rejection of abstract questions and double questions  Sarcasm in questioning. |  |  |
| 2.5.2 | Ambiguous Terminology  ‘Conditional’ words and their elimination in VTS messages  Consequences of misuse of ‘conditional’ words |  |  |
| 2.5.3 | ? Verbal and non-verbal communications |  |  |
| **2.6** | **HOW TO INTERPRET A MESSAGE** |  |  |  | **G1132** |
|  | *Understand how to interpret communications and validate the information received.* | 2.6.1 | Effective listening skills  Hearing  Clarity  Interpretation |  |  |
| 2.6.2 | Closed loop communications / Read-back  Reading-back received message  Breaking message into smaller components  Rephrasing message |  |  |

# REFERENCES REVELANT TO THIS MODULE

The following reference materials are relevant in the planning of this module:

* SMCP
* GL1132 on communications/ phraseology

# VTS OPERATOR COMPETENCE CHART

|  |  |  |  |
| --- | --- | --- | --- |
| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating Competence | Criteria for evaluating competence |
|  |  |  |  |
|  |  |  |  |

MODULE 3 – PROVISION OF VTS

# SCOPE

This module describes the subject areas, knowledge and practical competence to interact with participating ships and allied services in mitigating the development of unsafe situations through:

* The provision of timely and relevant information on factors that may influence the ship's movements and assist on-board decision making.
* The management of ship traffic to ensure the safety and efficiency of ship movements.
* Responding to developing unsafe situations.

# LEARNING OBJECTIVE

On the completion of the module the student will be able to demonstrate an understanding of, and knowledge in:

# RECOMMENDED TRAINING HOURS

The number of recommended hours are XXX.

# RECOMMENDED TRAINING AIDS AND EXERCISES

The teaching methods that should be used for the delivery of this module include:

* Classroom presentations and facilitated discussion

# PRE-COURSE READING MATERIAL

Prior to attending the course, it is suggested that a student be provided with at least the following materials:

* A.857 (xx)
* GL1089 (Revised)

# DETAILED TEACHING SYLLABUS

| Element | Session Objective | Sub-element | Subject Elements | Level of Competence | Resources |
| --- | --- | --- | --- | --- | --- |
| **3.1** | **VTS ENVIRONMENT** |  |  |  | **?R35, R37** |
|  | *To provide a broad understanding of the measures used to manage traffic within a VTS.* | 3.1.1 | Area limits, boundaries, separation zones, shipping lanes and channels |  |  |
| 3.1.2 | Prohibited or dangerous areas, safety zones, anchorages and restricted areas |  |  |
| 3.1.3 | Traffic separation schemes |  |  |
| 3.1.4 | Traffic separation criteria |  |  |
| 3.1.5 | Geographical constraints |  |  |
| 3.1.6 | Aids to navigation (e-navigation, virtual aids to navigation) |  |  |
|  | **Extract from the revised A.857(XXX) -**  **TIMELY AND RELEVANT INFORMATION**  .1 the provision of timely and relevant information on factors that may influence the ship's movements and assist on-board decision making. This may include:  .1 position, identity, intention and movements of ships;  .2 maritime safety information;  .3 limitations of ships in the VTS area that may impose restrictions on the navigation of other ships (e.g. manoeuvrability), or any other potential hindrances;  .4 other information such as reporting formalities and International Ship and Port Facility Security (ISPS) code details; and  .5 support to, and cooperation with, allied services; |  |  |  |  |
| **3.2** | **PROVISION OF INFORMATION** |  |  |  |  |
|  | *List and describe the relevance of vessel information* | 3.2.1 | Prioritising of participating vessels |  |  |
| 3.2.2 | Anticipating calls using available sensor information |  |  |
| 3.2.3 | Information from ships - name, call sign, type, position, speed, destination, ETA, special reports |  |  |
| 3.2.4 | Information to ships - content, timely, relevant |  |  |
| **3.3** | ALLIED SERVICES |  |  |  |  |
|  | *List and describe different allied services within a VTS area* | 3.3.1 | Information from allied services |  |  |
| 3.3.2 | Information to allied services - content, timely, relevant |  |  |
| **3.4** | **ISPS CODE** |  |  |  |  |
|  | *Provide an overview to the ISPS code with relation to ship and port security* | 3.4.1 | Overview of ISPS code and security levels  ~~Port policing~~  ~~Interaction with municipal, national and international security~~ |  |  |
| 3.4.2 | ~~General overview of security of VTS centres~~ ~~and outstations~~ |  |  |
| **3.5** | **DANGEROUS CARGOES** |  |  | **L4** | **?R8, R38, R40** |
|  | *To understand the types of dangerous cargo and special considerations for vessels transiting the VTS* | 3.5.1 | Types of dangerous cargo  International Maritime Dangerous Goods code (IMDG)  International Convention for the prevention of pollution from ships (MARPOL)  Local/regional contingency and emergency requirements |  |  |
| 3.5.2 | Special considerations for ships carrying dangerous cargo in a VTS area |  |  |
| 3.5.3 | Pollution control and response  Methods of containing  Methods of recovery  Role of VTS in national and local contingency/response plans |  |  |
|  |  |  |  |  |  |
|  | **Extract from the revised A.857(XXX) -**  **MONITORING AND MANAGEMENT OF SHIP TRAFFIC**  .2 the monitoring and management of ship traffic to ensure the safety and efficiency of ship movements. This may include:  .1 forward planning of ship movements;  .2 organizing ships underway;  .3 organizing space allocation;  .4 establishing a system of traffic clearances;  .5 establishing a system of voyage or passage plans;  .6 providing route advice; and  .7 ensuring compliance with and enforcement of regulatory provisions for which they are empowered; |  |  |  |  |
| **3.6** | **FORWARD PLANNING OF SHIP MOVEMENTS** |  |  |  |  |
|  | *Demonstrated a knowledge of procedures to plan for the safe movement and prioritisation of ship movements to prevent congestion or dangerous situations.* | 3.6.1 | Routeing  Channel geography  Traffic restriction areas  Anchorage areas  Obstructions | L4 |  |
| 3.6.2 | Type of traffic  Ship characteristics  Cargo characteristics |  |
| 3.6.3 | Information  Traffic  Waterway (Notice to shipping, regattas)  Environmental (visibility, waterspouts, dust storms, pollution) |  |
| **3.7** | **TOOLS USED IN THE SAFE MOVEMENT OF SHIPPING** |  |  |  |  |
|  | *To understand the key tools and parameters used to assist in the safe movement of shipping* | 3.7.1 | Water reference level  Tide gauges  Correlation between predicted and actual water levels  Allowance for delayed manoeuvres | L4 |  |
| 3.7.2 | Safe underkeel clearance  Draught measurements vertical ship movements, allowance for squat and swell  Safety margins in rock and soft sea-bed conditions  Net underkeel clearance  Gross underkeel clearance, including allowance for weather; exposure and topography |  |
| 3.7.3 | Safe air draft  Factors affecting and sources of information for calculating air draft |  |
| 3.7.4 | Safe channel width  Principles of devising a safe width under calm and adverse conditions  Limiting factors in precise navigation  Adequacy of safe underkeel clearance across channel width  Calculation of safe channel or fairway width |  |
| 3.7.5 | Shipping movements  Movements authorised only when safe criteria have been determined and conditions satisfactorily met |  |
| **3.8** | **ORGANIZING SHIPS UNDERWAY** |  |  |  |  |
|  | *To understand the traffic patterns and risks that can be managed when organising ships. For example, special transports or vessels with hazardous or polluting cargo may affect the flow of other traffic* | 3.8.1 | Traffic patterns  Normal traffic patterns  Non-routine items affecting traffic patterns (rogue vessels, weather) |  |  |
| 3.8.2 | Controllable risks  Experience of VTS Operators  Utilisation of equipment  Contingency plans/pollution  Uncontrollable risks  Geography  Meteorological factors  Hydrographic factors  Traffic congestion  Procedures to mitigate risks |  |  |
| **3.9** | **ORGANIZING SPACE ALLOCATION** |  |  |  |  |
|  | *To understand the allocation of space around a ship* | 3.9.1 | Ships domain  Authorising ship movements  Allocation of priorities |  |  |
| **3.10** | **ESTABLISHING A SYSTEM OF TRAFFIC CLEARANCES** |  |  |  |  |
|  | *Demonstrate the use of traffic clearances within the VTS area.* | 3.10.1 | Provision of traffic clearances (for situations such as entering an area, departing berth, prior to commencing a manoeuvre) |  | **G1132** |
| **3.11** | **ESTABLISHING A SYSTEM OF VOYAGE OR PASSAGE PLANS** |  |  |  |  |
|  | **???** | 3.11.1 | VTS sailing or route plan  Developing a plan to ensure safe and efficient movement of vessel traffic |  |  |
| **3.12** | **PROVIDING ROUTE ADVICE** |  |  |  |  |
|  |  | 3.12.1 |  |  |  |
| **3.13** | **MONITORING AND MANAGEMENT OF TRAFFIC** |  |  |  |  |
|  | *Demonstrate the capability to perform situational analysis to monitor and manage ship traffic in the VTS area* | 3.13.1 | Situation analysis  Conflict assessment  Spatial separation  Determination of relevant traffic  Participating/non-participating traffic  National and international regulations  Local procedures  Tools for determining relevant traffic - risk of collision, unclear intentions, non-routine action, blind corner etc |  |  |
| **3.14** | **ENSURING COMPLIANCE WITH AND ENFORCEMENT OF REGULATORY PROVISIONS FOR WHICH THEY ARE EMPOWERED** |  |  |  |  |
|  |  | 3.14.1 |  |  |  |
| **Extract from the revised A.857(XXX) -**  **RESPONDING TO DEVELOPING UNSAFE SITUATIONS**  3 responding to developing unsafe situations, which may include:  .1 a ship unsure of its route or position;  .2 a ship deviating from the route;  .3 a ship requiring guidance to an anchoring position;  .4 a ship that has defects or deficiencies, such as navigation or manoeuvring equipment failure;  .5 severe meteorological conditions (e.g. low visibility, strong winds);  .6 a ship at risk of grounding or collision; and  .7 emergency response or support to emergency services. |  |  |  |  |
|  |  |  |  |  |
| **3.15** | **INTERNATIONAL AND NATIONAL REGULATIONS/ PROCEDURES FOR EMERGENCY RESPONSE** |  |  |  |  |
|  | *Demonstrated knowledge of the scope of responsibilities and authority to act in emergency situations with regards to local, national and international regulations and procedures.* | 3.15.1 | International |  | SOLAS - SAR  MARPOL  Radio Regulations |
| 3.15.2 | National Policies / Procedures |  | National policies on MARPOL, Place of refuge etc |
| 3.15.3 | Local Contingency plans |  |  |
| **3.16** | **RESPONDING TO DEVELOPING UNSAFE SITUATIONS** |  |  |  |  |
|  | *Demonstrate the capacity to responding to developing unsafe situations through the provision of essential navigational information to assist on board navigational decision-making.* | 3.16.1 | Provision of navigational support  On request  On demand  Procedural |  | Revised GL1089 |
| 3.16.2 | ……. |  |  |
|  |  | 3.16.3 |  |  |  |
| **3.17** | **MAINTAIN A SAFE AND EFFICIENT WATERWAY THROUGHOUT EMERGENCY SITUATIONS** |  |  |  | ?R35, R37, R41, R58 |
|  | *Demonstrate the responses required to ensure the protection of the VTS area and, as far as practicable, maintain a safe and efficient flow of traffic.* | 3.17.1 | Commence alerting internal and external response agencies |  |  |
| 3.17.2 | Monitoring and management of ship traffic:  Alternative routing arrangements  Diversionary procedures (traffic in immediate incident area)  Anchorage areas  Introduction of emergency speed restrictions  Emergency alterations to VTS sailing/route plans and passage plans |  |  |
| 3.17.3 | Co-ordinate and provide support to allied services |  |  |
| 3.17.4 | Provision of situation reports |  |  |
| 3.17.5 | Provision of navigational warnings (if required) |  |  |
| **3.18** | **EXTERNAL EMERGENCIES** |  |  |  |  |
|  | *Demonstrate the use of standing operating procedures to respond to emergency situations, including the use of checklists and contingency plans as appropriate.* | 3.18.1 | Use of standing operating procedures to respond to emergency situations, such as:  Collision  Grounding  Marine pollution  Fire  Medical Emergency  SAR incidents, including man overboard  Extreme Weather |  |  |
| 3.18.2 | Introduction and use of checklists |  |  |
| **3.19** | **INTERNAL EMERGENCIES** |  |  |  |  |
|  | *Demonstrate the use of standing operating procedures to deal with internal emergencies affecting normal operations of a VTS centre* | 3.19.1 | Use of standing operating procedures to ensure continuity of operations in response to emergency situations, such as:  System Failure (eg communications, sensor equipment, decision support tools)  Internal emergencies (eg fire, flood, security incidents)  Forced evacuation of VTS centre |  |  |
| 3.19.2 | Maintaining VTS operations  Communications  Traffic image |  |  |
| **3.20** | **REPORTING AND ANALYSING OF INCIDENTS AND NEAR‐MISSES** |  |  |  |  |
|  | *Understand the importance of reporting and analysing of incidents and near‐misses* | 3.20.1 | Classification of casualty, incident, near‐miss |  | IMO (MSC Res.255(84))  IMO (MSC‐MEPC.7/Circ.7)  GL 1118 |
|  |  | 3.20.2 | ? do we need any other topics |  |  |

# REFERENCES REVELANT TO THIS MODULE

The following reference materials are relevant in the planning of this module:

# VTS OPERATOR COMPETENCE CHART

|  |  |  |  |
| --- | --- | --- | --- |
| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating Competence | Criteria for evaluating competence |
|  |  |  |  |
|  |  |  |  |

MODULE 4 – NAUTICAL KNOWLEDGE

# SCOPE

This module describes the essential elements of nautical knowledge that a VTS operator requires to understand and apply within the VTS area. Key elements covered include:

* collision regulations,
* buoyage and electronic aids to navigation systems,
* ship stability and handling,
* bridge operations and shipboard equipment,
* chartwork, and
* the effect of tides and tidal streams.

# LEARNING OBJECTIVE

On completion of the module, the student should have an understanding of ships and their systems to enable them to appreciate situations on board and to discuss matters and problems relating to the navigation of a ship through a VTS area with its master, pilot or navigating officer.

The student should also have sufficient knowledge of ships to understand limitations of manoeuvrability or the need for special treatment caused by malfunction of shipboard systems or the type of cargo being carried.

# RECOMMENDED TRAINING HOURS

The number of recommended hours are XXX.

# RECOMMENDED TRAINING AIDS AND EXERCISES

The teaching methods that should be used for the delivery of this module include:

* Classroom presentations and facilitated discussion

# PRE-COURSE READING MATERIAL

Prior to attending the course, it is suggested that a student be provided with at least the following materials:

* COLREGS
* IALA Buoyage system

# DETAILED TEACHING SYLLABUS

| Element | Session Objective | Sub-element | Subject Elements | Level of Competence | Resources |
| --- | --- | --- | --- | --- | --- |
| **4.1** | **COLREGS** |  |  |  |  |
|  | *Cite and explain the international regulations for preventing collisions at sea* | 4.1.1 | Definitions of specific COLREGS terms:  Application of the Collision Regulations  Application for ships  Application as pertains to VTS |  | R7 - COLREGS |
| 4.1.2 | Enforcement of regulations |  |  |
| 4.1.3 | Basic steering and sailing rules  International regulations  National specifications and variances |  |  |
| 4.1.4 | Conduct of vessels in specific conditions:  Narrow channels  Traffic Separation Schemes |  |  |
| 4.1.5 | International Distress Signals  Annex IV to the Collision Regulations |  |  |
| 4.1.6 | Basic lights, shapes and sounds as described in the Regulations |  |  |
| 4.1.7 | Description of Annexes I and III, and parts E and F |  |  |
| **4.2** | **MARINE AIDS TO NAVIGATION (ATONS)** |  |  |  |  |
|  | *Describe the use of marine AtoNs including the International Maritime Buoyage System, Radar Beacons and the use of virtual AIS AtoNs.* | 4.2.1 | International Maritime Buoyage System  Lateral systems (IALA A & B)  Cardinal systems  Implications of various systems |  | R43 |
| 4.2.2 | Regulations for buoyage systems  Characteristics of floating aids  Types of buoys  Placement of buoys  Fundamental rules for safe navigation  Chart symbols and abbreviations  Numbering of aids  Topmarks  Characteristics of fixed aids  Day beacons  Light stations  Ranges  Sector lights  Leading lights  Fog signals |  | R42 |
| 4.2.3 | Radar Beacons (RACONS/ Ramarks)  Purpose  Special characteristics  Recognition and identification  Limitations |  | R42, R34 |
| 4.2.4 | Virtual AtoNs  Application and use of virtual AtoNs |  |  |
| **4.3** | **USE OF SHIP TERMINOLOGY** |  |  |  |  |
|  | *Understand technical and nautical phrases commonly used with regards to ships* | 4.3.1 | Technical Phrases  Ship construction terms  Ship dimensions - i.e. LOA, LBP, beam, draught, air draught  Hull structure - i.e. types of bows, sterns  Loadlines draught marks |  |  |
| 4.3.2 | Nautical phrases  Directions/relative bearings  Numbers Mooring/anchoring terms |  |  |
| **4.4** | **INTRODUCTION TO SHIP STABILITY** |  |  |  |  |
|  | *Understand the principles of ship stability* | 4.4.1 | Definitions of heel, list and trim |  |  |
| 4.4.2 | Factors influencing ship stability |  |  |
| 4.4.3 | Recognising dangerous situations regarding ship stability |  |  |
| **4.5** | **INTRODUCTION TO SHIP HANDLING** |  |  |  |  |
|  | *Understand the theory and practice of ship handling* | 4.5.1 | Effect of pivot point on ship handling |  |  |
| 4.5.2 | Line of approach |  |  |
| 4.5.3 | Stopping characteristics |  |  |
| 4.5.4 | Turning characteristics |  |  |
| 4.5.5 | External forces on ship handling – winds and tides |  |  |
| 4.5.6 | Effect of interaction and squat |  |  |
| 4.5.7 | Vessel manoeuvrability |  |  |
| 4.5.8 | Different types of rudder |  |  |
| 4.5.9 | Different types of propeller |  |  |
| 4.5.10 | Thrusters |  |  |
| 4.5.11 | Use of tugs within a port |  |  |
| **4.6** | **BRIDGE OPERATIONS** |  |  |  | ? R11, R13, R10, R35, R37 R39 |
|  | *Understand the elements of bridge operations* | 4.6.1 | Maintaining a navigational watch  Under routine circumstances  In pilotage waters  In non-pilotage restricted waters |  |  |
| 4.6.2 | Response to emergencies which arise in a VTS area  Regulations governing transit of vessels with regard to special circumstances  Expected actions on board vessels during special circumstances |  |  |
| 4.6.3 | Bridge operations (arrival & departure)  Berthing  Anchoring |  |  |
| **4.7** | **LAYOUT OF BRIDGE** |  |  |  |  |
|  | *Provide an overview of the equipment used on the bridge.* |  | Introduction to echo sounders  Introduction to speed logs  Principles of speed logs  Accuracy of speed logs  Introduction to ECDIS and ECS  Means of displaying information  Symbology  Uses and limitations  Chart datums |  |  |
|  |  |  |  |  |  |
| **4.7** | **USE OF GYRO AND MAGNETIC COMPASSES** |  |  |  |  |
|  | *Explain the theory and use of Magnetic and Gyro compasses* | 4.7.1 | Magnetic compasses  Sources of error  Corrections  Reliability |  |  |
| 4.7.2 | Gyro compass  Accuracy  Corrections  Reliability |  |  |
| **4.8** | **NAUTICAL THEORY** |  |  |  | ?R4, R27 |
|  | *Understand the basic elements of nautical theory* | 4.8.1 | Finding positions on the globe - lat/long, great circle |  |  |
| 4.8.2 | Chart projections and geodetic datums |  |  |
| 4.8.3 | Identify and describe the importance of key chart symbols for:  for the VTS area  to the mariner |  |  |
| 4.8.4 | Measuring distances on charts |  |  |
| 4.8.5 | Measuring range and bearing |  |  |
| **4.9** | **SPEED/DISTANCE/TIME CALCULATIONS** |  |  |  |  |
|  | *Perform exercises on speed/distance/time calculations* | 4.9.1 | Introduction of S, D, T formula (S x T = D)  Use of formula in simple situations  Use of formula in complex situations |  |  |
| **4.10** | **TIDES AND TIDAL STREAMS** |  |  |  |  |
|  | *Describe the effect of tides and tidal streams* | 4.10.1 | Explain the definition of terms relating to tides and tidal streams  Chart datum  Spring/neap tides  Ebb/flow/slack/eddies  Set/drift/rate  Diurnal/semi-diurnal |  |  |
| 4.10.2 | Demonstrate the use of tide and current tables  Information contained in tide tables  Reading tide tables  Reading current tables  Overview of calculating intermediate heights and times  Overview of primary and secondary ports |  |  |
| 4.10.3 | Effects of tides and currents on safety of waterway and ship manoeuvrability |  |  |
| 4.10.4 | Application of COLREGS with regards to tides and currents |  |  |
| 4.10.5 | Planning waterway movements taking into account tides and currents |  |  |
| **4.11** | **METEOROLOGICAL ELEMENTS** |  |  |  |  |
|  | *Describe the effect of external forces on vessels.* | 4.11.1 | Effects of wind on safety of waterway and ship manoeuvrability |  |  |
| 4.11.2 | Effects of reduced visibility on safety of waterway |  |  |
| 4.11.3 | Effects of high and low pressure systems on water height and depth |  |  |

# REFERENCES REVELANT TO THIS MODULE

The following reference materials are relevant in the planning of this module:

* R7 - Colregs
* R42
* R43

# VTS OPERATOR COMPETENCE CHART

|  |  |  |  |
| --- | --- | --- | --- |
| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating Competence | Criteria for evaluating competence |
|  |  |  |  |
|  |  |  |  |

MODULE 5 - VTS EQUIPMENT

# SCOPE

This module describes the basic theory and the limitations of key equipment currently used in VTS centres.

# LEARNING OBJECTIVE

On the completion of the module the student will be able to demonstrate an understanding of, and knowledge in:

* The key sensors and equipment used in VTS
* Understand the limitations that may affect the performance of equipment

Note – Detailed operation of equipment at a VTS centre will be delivered by VTS Authorities during the V103/1 OJT model course.

# RECOMMENDED TRAINING HOURS

The number of recommended hours are XXX.

# RECOMMENDED TRAINING AIDS AND EXERCISES

The teaching methods that should be used for the delivery of this module include:

* Classroom presentations and facilitated discussion

# PRE-COURSE READING MATERIAL

Prior to attending the course, it is suggested that a student be provided with at least the following materials:

* G1111 – XXX
* IALA guidance docs on AIS GXXXX

# DETAILED TEACHING SYLLABUS

.

| Element | Session Objective | Sub-element | Subject Elements | Level of Competence | Resources |
| --- | --- | --- | --- | --- | --- |
| **5.1** | **VHF** |  |  |  | **? R34, R41, R49, R57** |
|  | *Describe how VHF works and the limitations of the equipment* | 5.1.1 | Basic knowledge  Frequency Channels  Simplex working  Semi duplex  Duplex working  Distress, safety and calling frequencies  Principles, controls and operation of VHF  Channel spacing  Modulation  Range |  |  |
| 5.1.2 | Limitations  Equipment failure and channel saturation |  |  |
|  |  |  |  |
| **5.2** | **RADAR** |  |  |  | **? R42, R49, R57 ? R34, R41,** |
|  | *Describe how Radar works and the limitations of the equipment* | 5.2.1 | Basic Knowledge  Fundamentals of RADAR theory  List the features of generic VTS radar display  Detection, acquisition and tracking  System warnings  Sensor fusion  Introduction to tracking systems and ARPA  ARPA features and use of radar for collision avoidance |  |  |
| 5.2.2 | Limitations  Factors affecting radar detection  Factors affecting interpretation |  |  |
| **5.3** | **AIS** |  |  |  | **? ? R34, R41, R49, R57** |
|  | *Describe how AIS works and the limitations of the equipment* | 5.3.1 | Basic Knowledge  Principles and operation of AIS |  | **? R18, R25, R31, R34, R51, R53, R56** |
| 5.3.2 | Limitations  Equipment failure and channel saturation |  |  |
| **5.4** | **VIDEO** |  |  |  | **? R34, R41, R49, R57** |
|  | *Describe the function and different types of video equipment used in VTS.* | 5.4.1 | Differences between types of video equipment  Close circuit (CCTV)  Low light (LLTV)  Infra-red |  |  |
| 5.4.2 | Limitations of video equipment |  |  |
| **5.5** | **METEOROLOGICAL/HYDROLOGICAL EQUIPMENT** |  |  |  |  |
|  | *Describe the application of meteorological and hydrological equipment* | 5.5.1 | Hydrological equipment  Tide gauges - remote height of tide indicators  Tidal stream indicator - remote indications |  |  |
| 5.5.2 | Meteorological equipment  Barometer  Temperature/humidity indicators  Anemometers  Visibility |  |  |
| **5.6** | **DECISION SUPPORT TOOLS** |  |  |  |  |
|  |  | 5.6.1 | Limitations  Fusing of Targets |  |  |
| 5.6.2 |  |  |  |

# REFERENCES REVELANT TO THIS MODULE

The following reference materials are relevant in the planning of this module:

# VTS OPERATOR COMPETENCE CHART

|  |  |  |  |
| --- | --- | --- | --- |
| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating Competence | Criteria for evaluating competence |
|  |  |  |  |
|  |  |  |  |

MODULE 6 – PERSONAL ATTRIBUTES

# SCOPE

This module focuses on the role of a VTS operator, in particular teamwork, the impact of stress and the importance to manage fatigue.

# LEARNING OBJECTIVE

To …..

# RECOMMENDED TRAINING HOURS

The number of recommended hours are XXX.

# RECOMMENDED TRAINING AIDS AND EXERCISES

The teaching methods that should be used for the delivery of this module include:

* Classroom presentations and facilitated discussion

# PRE-COURSE READING MATERIAL

No pre-course reading materials have been identified for this module.

Prior to attending the course, it is suggested that a student be provided with at least the following materials:

* ???

# DETAILED TEACHING SYLLABUS

| Element | Session Objective | Sub-element | Subject Elements | Level of Competence | Resources |
| --- | --- | --- | --- | --- | --- |
| **6.1** | **TEAMWORK** |  |  |  |  |
|  | *To understand the benefits of working effectively as a team* | 6.1.1 | Characteristics of leaders and followers |  |  |
| 6.1.2 | Adaptability/ flexibility  Diplomacy |  |  |
| 6.1.3 | Decision making process  Taking initiative  Prioritising tasks  Thinking critically  Communicating with team members  Assertiveness |  |  |
|  |  |  |  |  |  |
| **6.2** | **FATIGUE MANAGEMENT AND SHIFTWORK** |  |  |  |  |
|  |  | 6.2.1 | Stress  Causes of stress  Managing work related stress  Managing personal stress |  |  |
| 6.2.2 | Managing fatigue  Time management |  |  |
| 6.2.3 | Shiftwork and rosters |  |  |
|  |  | 6.2.4 | Safety and Health awareness |  |  |
|  |  |  |  |  |  |

# REFERENCES REVELANT TO THIS MODULE

The following reference materials are relevant in the planning of this module:

# VTS OPERATOR COMPETENCE CHART

|  |  |  |  |
| --- | --- | --- | --- |
| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating Competence | Criteria for evaluating competence |
|  |  |  |  |
|  |  |  |  |

1. EXISTING TEXT CURRENTLY PRESENT IN THE 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)

VTMIS Vessel Traffic Management Information System(s)

VTS Vessel Traffic Services

1. DELIVERY OF THE MODEL COURSE

# INTRODUCTION

# COURSE MODULES

# SUBJECT OUTLINE

# DETAILED TEACHING SYLLABUS

The detailed teaching syllabus, of each module has been written in learning-objective format in which the objective describes what the participant must do to demonstrate that knowledge has been transferred. All objectives are understood to be prefixed by the words:

*the expected learning outcome is that the participant has acquired the recommended levels of competence in …….*

# PRESENTATION

# EVALUATION OR ASSESSMENT OF THE COURSE PARTICIPANTS

# IMPLEMENTATION

# VALIDATION

1. COURSE FRAMEWORK

# INTRODUCTION

# REQUIREMENTS FOR ATTAINING THE COURSE CERTIFICATE

* .

# COURSE INTAKE – LIMITATIONS

# TRAINING STAFF REQUIREMENTS

## Course instructors

## Course Assessors

# TEACHING FACILITIES AND EQUIPMENT

1. .
2. GUIDELINES FOR INSTRUCTORS

# INTRODUCTION

# CURRICULUM

.

.

# LESSON PLANS



# EVALUATION OR ASSESSMENT



.




2. COURSE MODULES

The complete course comprises eight modules, each of which deals with a specific subject representing a requirement or function of a VTS Operator, followed by simulated exercises and assessment intended to be representative of events and incidents likely to be experienced in a VTS centre. The recommended duration in hours do not include the time necessary for examinations or tests of proficiency.

2. Recommended Course Hours



| Module / Subject | Recommended Duration in Hours1 | | Remarks2 | |
| --- | --- | --- | --- | --- |
| Presentations / Lectures | Exercises / Simulation |
| 1 – Communication [and Interaction] [Co-ordination]3 | 91 + 7 +11 | 75+11 +31 | * General communication skills * Language structure and VTS Messages * Use of radio communication in VTS4 | * SMCP and Standard phrases * Specific VTS messages construction * Information management |
| 2 – Legal Framework | 10 | 8 | * International, national [local] framework for VTS * Regulatory requirements | * Roles and responsibilities * Record keeping |
| 3 – Traffic Management | 52 (- 10) | 54 (-8) | * VTS environment * Provision of information * Principles of water space management | * Monitoring and management * Responding to unsafe situations |
| 4 – Nautical Knowledge | 85 | 38 | * Chart work * Collision regulations * Aids to navigation | * Navigational aids (ship borne) * Shipboard knowledge * Port operations and other allied services |
| 5 – Equipment | 39 +4 | 6 +11 | * Sensors in VTS (radar, AIS, CCTV, etc) * Benefits and limitations of VTS equipment | * Tracking systems, decision support tools * Evolving technologies |
| 6 – Personal Attributes | 6 | 4 | * Fatigue management and shiftwork * Human relation skills | * Responsibility and reliability * Teamwork |
| 7 – Emergency Situations | 12 | 10 | * Internal/external emergencies * Contingency plans * Prioritise and respond to situations | * Record activities concerning emergencies * Maintain a safe waterway throughout emergency situations |
| Total | **307** | **240** |  |  |

*Notes: 1 The recommended times are, except for Module 1, based on the assumption that trainees have no or little previous knowledge of the subject. The actual time required for each module will vary, depending on previous experience and the entrance level of the trainee.*

*2. In addition to the recommended duration in this table, see table 3 Simulation exercises in Part D, section 5 Practical training.*

*3. The recommended hours for Module 1 assume that trainees have achieved, IELTS level 5, or the equivalent.*

*4. VTS personnel will require a VHF radio operator certificate, timing is not included in this course.*

COMMUNICATION CO-ORDINATION AND INTERACTION

INTRODUCTION

Instructors for this module should be skilled in the use of English and the IMO Standard Marine Communication Phrases (SMCP).

Background

English is the accepted language of international business, trade and diplomacy. Subsequently there is a very high demand for education in the language as well as a high demand for other academic qualifications taught in English. This has led to the establishment of reliable tests to demonstrate that trainees have attained a sufficient level of the language to follow their chosen course or profession (see ANNEX 4, Example of English language tests).

SUBJECT FRAMEWORK

Scope

This syllabus covers the requirement for VTS Operators to have a sufficient knowledge of the English language to be able to operate in the VTS environment, use VTS equipment, decision support tools and nautical publications communicate with ships and allied services for VTS purposes, and implement contingency plans. In addition, VTS Operators must have sufficient communication skills to understand meteorological and oceanographic information.

Aims of Module 1

On completion of the course trainees will have knowledge of the English language and its composition and structure in respect of maritime terminology and the IMO Standard Marine Communication Phrases to enable them to carry out the duties of a VTS Operator using the English language.

It is emphasized that, by the regular employment of standardized marine vocabulary, VTS Operators will clearly communicate in routine and emergency situations at their VTS centre.

SUBJECT OUTLINE OF MODULE 1

1. Subject outline – Communication Coordination and Interaction

|  |  |  |  |
| --- | --- | --- | --- |
| **Subject Area** | **Recommended Competence Level** | **Recommended Hours1** | |
| **Presentations/ Lectures** | **Exercises/ Simulation** |
| **General communication skills**  Interpersonal communication  Procedures to enhance effective communication  Verbal and non-verbal communications  Cultural aspects and common understanding of messages communicated  Questioning techniques | Level 3 |  |  |
| **Language structure**  Message construction in English  English for special purposes, redundancy and precision  Elimination of ambiguity by choice of words  Elimination of ambiguity by special techniques  Status of a message | Level 3 |  |  |
| **Specific VTS message construction**  Construction of messages  Speech devices to imply higher message status  IALA Guideline | Level 4 |  |  |
| **SMCP / Standard phrases**  The application of standard phrases  The IMO SMCP in general  The IMO SMCP, part 3, section 6, VTS  Use of Message Markers | Level 3 |  |  |
| **Information Management**  **Communications [and data]**  Collection  Evaluation  Dissemination  **Log and record keeping**  Objective  Manual log keeping  Electronic log keeping  Statement and report writing | Level 3 |  |  |
| **Use of VHF radio communication in VTS**  Communication procedures, including SAR  Equipment failure and channel saturation | Level 4 |  |  |
|  |  | Total 91 +7 + 11 hours | Total 75 +11 + 31 hours |

*Notes: 1. The time required for module 1 above will vary with the entrance level of the trainee.*

*The recommended hours are set on the assumption that the trainee has achieved IELTS level 5 or the equivalent and possesses a valid VHF radio operator certificate.*

DETAILED TEACHING SYLLABUS FOR MODULE 1 – Communication Coordination and interaction

1. Detailed Teaching Syllabus – Communication Coordination and Interaction

| **Subjects / Learning Objectives** | **Reference** | **Teaching Aid** |
| --- | --- | --- |
| *Have a sufficient knowledge of the English language to be able to use charts and other nautical publications, understand meteorological and oceanographic information and communicate with vessels and allied services for VTS mission purposes.* |  |  |
| **Language structure** |  |  |
| Explain the use of English for special purposes, redundancy and precision  The exclusion of all items, except those directly applicable to the subject  Legal and engineering terminology and their different structures  Advantages and disadvantages of redundancy  The choice of precise words to express meaning | R6, R19, R32 | A1 or A8  A1 |
|  | R19 (VTS section) | A1 or A8 |
| Legal implications of using message markers, particularly “Warning”, “Information”, “Advice” and “Instruction” Legal and psychological relationship between master, pilot and VTS, and the use of message markers | R19 (VTS section), R13 | A1 |
| **Specific VTS message construction** |  |  |
|  | R19 | A1 |
| *Explain speech techniques to imply higher message status* |  |  |
| **Standard phrases** | R19 | A1 |
|  |  |  |
|  |  |  |
|  |  |  |
| **Collecting information** | R19 | A1 |
|  |  |  |

From original Module 5 – Communication Coordination:

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| General communication skills |  |  |
| *Possess the knowledge of the basic principles of communication and coordination.* |  |  |
| Effective team communications |  | A6 and A7 for documented case studies |
|  |  |  |
| Demonstrate verbal and non-verbal communications  Voice inflection  Non-verbal signals or symbols – internal  Non-verbal signals or symbols – external |  |  |
|  |  |  |

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| Communications |  |  |
| Demonstrate and explain data collection  Formal messages - ship reporting  Ship-ship  Ship-shore  Shore-ship  Shore-shore  Electronic data exchange  Ship-ship  Ship-shore  Shore-ship  Shore-shore | R2, R3, R16, R28, R35, R37, R41 | A6 and A7 for documented case studies. |
| Explain the use of a communications plan of action  Define as routine / non-routine  Define emergencies – incidents / accidents  Identify objectives  Define resources  Formulate plan in accordance with contingency plan  Consider “worst case” / “what if” scenario  Modify plan or objectives as necessary | R19, R28, R37, R41 | A6 and A7 for documented case studies and scenarios of maritime disasters  Exercises |
|  | R19, R58 |  |
|  |  |  |
|  |  |  |
|  | R28, R37, R41, R44 |  |
| Filing  Back-up arrangements  Storing |  |  |
| State the purposes and requirements for statement and report writing  Statutory  Electronic and manual  Legal implications |  |  |

From Original Module 6 – VHF radio

|  |  |  |
| --- | --- | --- |
| Principles, controls and operation of DSC  Format of a transmission sequence  Message composition  Error checks  Principles, controls and operation of AIS  Format of a transmission sequence  Message composition  Automatic and manual modes | R34  R29  R30  R18, R25, R34, R31, R47, R51, R53 |  |
|  |  |  |
|  |  |  |
| VHF Radiotelephone procedures  DSC communication procedures using VHF  AIS communication procedures using VHF  Equipment failure and channel saturation | R13, R21, R28, R29, R34  R29, R30  R18, R25, R34, R31, R47, R51, R53  R34 | A12 or A13,  E1, E5 |

LEGAL FRAMEWORK

INTRODUCTION

Instructors for this module should have experience in in general VTS and maritime fields, including the international regulatory elements of VTS. If this cannot be achieved then an appropriate expert should cover certain sections of the module. Every instructor should have full access to simulated VTS. In addition, arrangements should be made, if practicable, for trainees to visit operations VTS centres.

SUBJECT FRAMEWORK

Scope

This syllabus covers the theory and implementation of legal aspects related to VTS, includingapplicable international and national regulations

.

Aims

On completion of the course the trainee will possess a thorough knowledge of the principles of traffic management and the skills to analyse and apply the knowledge. In addition, the trainee will have a good understanding of national and international regulations as pertaining to the provision and conduct of vessel traffic services.

The understanding by trainees of the subject and knowledge and skills gained in other areas, including on-the-job training, will enable the routine day-to-day duties of a VTS Operator to be carried out in an efficient and safe manner.

They will also have sufficient knowledge, comprehension and skills in the subject to serve as the basis for further training to the level of VTS Supervisor.

Every effort should be made to give the trainees realistic exercises on the role of VTS in assisting a ship to navigate safely and expeditiously through a VTS area. Integrated exercises on handling emergency situations should also be carried out.

SUBJECT OUTLINE OF MODULE 2

1. Subject outline – Legal Framework

| Subject Area | Recommended Competence Level | Recommended Hours | |
| --- | --- | --- | --- |
| Presentations/ Lectures | Exercises/ Simulation |
| **Regulatory requirements**  International regulations  National regulations including local bye laws  Legal liabilities of VTS functions  Safety related ship certificates | Level 2  Level 1  Level 1  Level 1 |  |  |
| **International, national [local] framework for VTS** |  |  |  |
| **Roles and responsibilities**  Ship masters  Marine pilots  VTS  Allied services | Level 1  Level 1  Level 3  Level 1 |  |  |
| **Log and record keeping**  Objective  Manual log keeping  Electronic log keeping  Statement and report writing | Level 3 |  |  |
|  |  | Total 10 hours | Total8 hours |

DETAILED TEACHING SYLLABUS OF MODULE 2

1. Detailed teaching syllabus – Legal Framework

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| Regulatory requirements | R1, R2, R3, R7, R12, R14, R16, R17, R35, R36, R37 |  |
| *Identify the legislative requirements relating to the VTS area and protection of the marine environment* |  |  |
| . |  |  |
| National regulations, including local bye laws  Bye laws  Notices to Mariners and other nautical publications |  |  |
|  |  |  |
| Carriage of relevant ship certificates |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

DETAILED TEACHING SYLLABUS OF MODULE 2

1. Detailed teaching syllabus – Legal Framework

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| Regulatory requirements | R1, R2, R3, R7, R12, R14, R16, R17, R35, R36, R37 |  |
| *Identify the legislative requirements relating to the VTS area and protection of the marine environment* |  |  |
|  |  |  |
| National regulations, including local bye laws  Bye laws  Notices to Mariners and other nautical publications |  |  |
|  |  |  |
| Carriage of relevant ship certificates |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

TRAFFIC MANAGEMENT

INTRODUCTION

Instructors for this module should have experience in traffic routeing and traffic management as well as in the general VTS and maritime fields. If this cannot be achieved then an appropriate expert should cover certain sections of the module. Every instructor should have full access to simulated VTS. In addition, arrangements should be made, if practicable, for trainees to visit operations VTS centres.

SUBJECT FRAMEWORK

Scope

This syllabus covers the theory and practice of managing traffic in a VTS area, including area limits, shipping lanes, safety zones, traffic separation schemes and geographical constraints.

It also deals with the theory and practice of monitoring and organising traffic.

Aims

On completion of the course the trainee will possess a thorough knowledge of the principles of traffic management and the skills to analyse and apply the knowledge. .

The understanding by trainees of the subject and knowledge and skills gained in other areas, including on-the-job training, will enable the routine day-to-day duties of a VTS Operator to be carried out in an efficient and safe manner.

They will also have sufficient knowledge, comprehension and skills in the subject to serve as the basis for further training to the level of VTS Supervisor.

Every effort should be made to give the trainees realistic exercises on the role of VTS in assisting a ship to navigate safely and expeditiously through a VTS area. Integrated exercises on handling emergency situations should also be carried out.

SUBJECT OUTLINE OF MODULE 3

1. Subject outline – Traffic management

| Subject Area | Recommended Competence Level | Recommended Hours | |
| --- | --- | --- | --- |
| Presentations/ Lectures | Exercises/ Simulation |
| **VTS environment**  Area limits, boundaries, separation zones, shipping lanes and channels  Prohibited or dangerous areas, safety zones, anchorages and restricted areas  Traffic separation schemes  Traffic separation criteria  Geographical constraints | Level 2 |  |  |
| **Provision of Information** |  |  |  |
| **Principles of waterway and traffic management**  Planning  Risk management  Allocation of space  Criteria which determines the parameters for the safe passage of shipping  Aids to navigation | Level 4 |  |  |
| **Monitoring and Management of Vessel Traffic**  Traffic patterns  VTS sailing or route plans  Situation analysis | Level 4 |  |  |
| **Responding to unsafe situations** |  |  |  |
|  |  | Total 42 hours | Total 44 hours |

DETAILED TEACHING SYLLABUS OF MODULE 3

1. Detailed teaching syllabus – Traffic management

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| VTS environment | R35, R37 | A1,A2 |
| *Demonstrate a knowledge of the VTS operational area, including geographical features, traffic routing measures and aids to navigation* |  |  |
| Area limits, boundaries, separation zones, shipping lanes and channels |  |  |
| Prohibited or dangerous areas, safety zones, anchorages and restricted areas |  |  |
| Traffic separation schemes |  |  |
| Traffic separation criteria |  |  |
| Geographical constraints |  |  |
| Aids to navigation (e-navigation, virtual aids to navigation) |  |  |

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| **Principles of waterway and traffic management** | R1 to R7 inclusive,  R17, R35, R41, R58, R59 | A1, A2, A3, A5, A6, A7  E2 during simulated exercises |
| *Demonstrate a knowledge of the procedures for maintaining a safe and efficient waterway* |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Criteria which determine the parameters for the safe passage of shipping |  |  |
| **Traffic monitoring and organisation** | R17, R37, R41 | A1, A2, A3, A5, A6, A7  E2 during simulated exercises |
| *Demonstrate a knowledge of traffic patterns, sailing/route plans and perform situational analysis required to maintain a safe and efficient waterway* |  |  |
|  |  |  |
|  |  |  |
|  | R7, R41, R35, R36 |  |

NAUTICAL KNOWLEDGE

INTRODUCTION

Instructors for this module should have a good knowledge of ship bridge activities as well as a recognised marine qualification. If this cannot be achieved, then the appropriate expert should cover certain sections of this module. Every instructor should have full access to simulation equipment. In addition, if possible, arrangements should be made for trainees to visit operational VTS centres.

SUBJECT FRAMEWORK

Scope

This syllabus covers the requirement for VTS Operators to be able to carry out certain navigational functions and to have sufficient knowledge of ships to understand limitations of manoeuvrability or the need for special treatment caused by malfunction of shipboard systems or the type of cargo being carried.

This course covers the theory and practice of chartwork, provides knowledge of the collision regulations, buoyage and electronic aids to navigation systems as well as shipboard navigational equipment. It also provides an understanding of ship design matters, certain shipboard systems and some circumstances external to a ship which might influence its behaviour.

This course also provides knowledge of port operations as well as other services provided to shipping by ports, harbours and offshore installations.

Aims

On completion of the course trainees will be able to

* read information from a chart;
* fix the position of ships on a chart;
* read information from tide tables; and
* carry out course, speed and distance calculations, taking into account any set, drift or leeway.

The trainees will also have a sufficient understanding of ships and their systems to enable them to appreciate situations on board and to discuss matters and problems relating to the navigation of a ship through a VTS area with its master, pilot or navigating officer.

The course will also enable trainees to have knowledge of port operations and the ability to co-ordinate information relating to other services provided by port and harbour authorities including offshore installations.

If a simulator is available, it is possible to give the trainees realistic exercises on navigating a vessel and the role of VTS in giving assistance to navigate safely and expeditiously through a VTS area. Consideration should be given to running simulated exercises to demonstrate the manoeuvrability of different types of vessel. Integrated exercises on handling emergency situations could also be carried out.

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 on paper charts  Course/speed/distance/time calculations  True and magnetic courses  Passage planning  Tides and tidal streams  Correcting paper 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 | |

DETAILED TEACHING SYLLABUS OF MODULE 4

1. Detailed teaching syllabus – Nautical knowledge

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| Chartwork | R4, R27 | A1, A2, A3, A6, A7 |
| Chart information and terminology  Demonstrate knowledge of charts and the information contained thereon  Finding positions on the globe - lat/long, great circle  Chart projections and geodetic datums |  |  |
| Plotting positions on paper charts  Demonstrate the basic plotting instruments  Parallel rulers  Compass/dividers  Loran-C interpolations, if applicable  Demonstrate the ability to plotting on charts (using various projections as appropriate)  Using parallel rulers  Using parallel rulers and compass/dividers  Measuring distances on charts  Explain the use of Lines of Positions (LOPs)  Bearings  Ranges  Loran-C, if applicable  Combination of LOPs  Definition of “cocked hat”  LOPs given from ships and calculated from shore positions |  |  |
| Perform exercises on speed/distance/time calculations  Introduction of S, D, T formula (S x T = D)  Use of formula in simple situations  Use of formula in complex situations |  |  |
| Explain the theory and practice use of true and magnetic courses  Perform exercise in laying of a true course  Using parallel rulers to compass rose  Using parallel rulers to line of longitude on Mercator charts  Reading courses off charts  Perform exercise in Dead Reckoning (DR) positions  Accepted symbology used on charts  Calculating and measuring for DR positions  Perform exercise in compass and magnetic courses  Definition of variation, deviation and compass error  Problems associated with using magnetic compass or true courses from shore-based position |  |  |
| Describe the importance of passage planning  The requirement for a vessel to create and use a passage plan  The four key elements of a passage plan – appraisal, planning, execution and monitoring  Ascertaining waterway information using charts and symbols  Formulating plans of action using information provided, chart information, tidal information, etc.  Contingency planning |  |  |
|  |  |  |
| Correcting paper charts and publications  Introduction to Notices to Mariners  Introduction to written Notices to Mariners  Introduction to broadcast notices to shipping, including fishing vessels  Methods of correcting publications  Procedures for corrections  Recording corrections  Methods of correcting paper charts  Procedures for corrections  Recording corrections  Temporary and preliminary corrections |  |  |

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| Collision regulations |  |  |
| Cite and explain the International Regulations for Preventing Collisions at Sea  Definitions of specific terms in the Collision Regulations  Application of the Collision Regulations  Application for ships  Application as pertains to VTS  Enforcement of regulations  Basic steering and sailing rules  International regulations  National specifications and variances  Conduct of vessels in specific conditions  Conduct in narrow channels  Conduct in Traffic Separation Schemes  International Distress Signals  Annex IV to the Collision Regulations  Basic lights, shapes and sounds as described in the Regulations  Description of the contents of Annexes I and III, and parts E and F | R7 | A1, A2  Case studies |

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
|  |  |  |
|  | R43  R42  R42 | A1, A2 |
|  | R42, R34, |  |
| Explain the theory and use of satellite and differential satellite position fixing systems  Introduction to global navigation satellite systems (GNSS)  Purpose of GNSS and DGNSS  Types of GNSS and DGNSS  Implications to VTS  Limitations | R42 |  |
|  |  |  |
| Navigational aids (shipborne) |  |  |
|  | R42, R49, R57 |  |
|  |  |  |
| Explain the theory and use of other navigational aids  Introduction to echo sounders  Introduction to speed logs  Principles of speed logs  Accuracy of speed logs  Introduction to ECDIS and ECS  Means of displaying information  Symbology  Uses and limitations  Chart datums | R22 |  |
| Shipboard knowledge |  |  |
|  |  |  |
|  |  |  |
| List and describe the types of vessels  General cargo ships  Tankers  Bulk carriers  Combination carriers  Container ships  Passenger ships  Ro-ro ships  Fishing vessels  Offshore vessels  Rigs  Offshore supply  Offshore tugs  Tugs  Pilot boats  SAR vessels  Seaplanes  WIG  Ships operated by allied services |  |  |
| List and describe the types of cargo  General cargo  Refrigerated  Liquid  LPG/LNG  Bulk  Containers  Ro-ro  Fish  Livestock  Dangerous goods |  |  |
|  |  |  |
|  |  |  |
| List and describe different propulsion systems  Introduction to propulsion systems  Diesel, diesel electric  Gas turbine  Steam  Jet |  |  |
| Explain the list of external forces on vessels  Meteorological elements  Effects of wind on safety of waterway and ship manoeuvrability  Effects of reduced visibility on safety of waterway  Effects of high and low pressure systems on water height and depth  Oceanographic factors |  |  |
|  | R10  R11, R13, R10, R35, R37R39 |  |
| Port operations and other allied services |  |  |
| Explain pilotage operations  Introduction to pilotage operations  Pilotage waters  Responsibilities of pilots  Master/pilot/VTS relationship | R35, R36, R37 |  |
| Describe port operations including contingency plans  Overview of port operations  Interaction of all agencies within a port  Responsibilities of harbour masters and berthing masters  Clearance procedures  Intermodal transport  Regulations and acts in effect within harbour limits  Contingency plans  Pollution  SAR  Grounding  Salvage  Fire  Security  Health |  |  |
| Cite and explain the ISPS code with relation to ship and port security  Overview of ISPS code  Port policing  Interaction with municipal, national and international security  General overview of security of VTS centres and outstations |  |  |
| Explain the organisation of tugs and towing | See also “Ship handling” |  |
| Explain the role of ships agents  General duties of ships agents  The role of ships agents |  |  |

EQUIPMENT

INTRODUCTION

Instructors for this module should have experience in the installation and operation of equipment and systems used in vessel traffic services as well as in the general VTS and maritime fields. If this cannot be achieved then an appropriate instructor should cover certain sections of the module. Every instructor should have full access to simulated VTS. In addition, arrangements should be made, if practicable, for trainees to visit operational VTS centres.

SUBJECT FRAMEWORK

Scope

This syllabus covers the requirement for VTS Operators to be able to understand the functionalities and operational principles of the basic equipment used in VTS centres.

This course covers the theory and practice of using the basic equipment including the equipment used for data collection and data analysis, audio and video recording and ship identification.

Aims

On completion of the course trainees will possess knowledge of the basic application of VTS equipment and the skills to use the equipment to provide shipping with the service required by the VTS authority.

The trainees will also have been sufficiently trained to use ship identification systems and will be familiar with methods of recording and displaying information. They will also have the skills to operate VTMIS and other computer systems for the purpose of assisting the development of VTS traffic images.

If a simulator is available it is possible to give the trainees realistic exercises on the use of basic VTS equipment and its use in assisting a ship to navigate safely and expeditiously through a VTS area. Integrated exercises on handling emergency situations could also be carried out.

SUBJECT OUTLINE OF MODULE 5

1. Subject outline - Equipment

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| Sensor in VTS (Radar, audio, video and other sensors)  Basics of coastal radar and its applications to VTS  Generic VTS radar display features  The Automatic Identification System (AIS)  Recording/replay equipment (audio / video)  Meteorological and hydrological sensors  VHF Direction finding (VHF/DF) | Level 1  Level 3  Level 1 |  |  |
| VHF radio systems and their use in VTS  Frequencies in the VHF maritime mobile band (ITU RR Appendix S18)  National frequency assignments to VTS  Introduction to basic VTS VHF radiotelephone, DSC and AIS equipment  VHF data exchange system (VDES) | Level 3 |  |  |
| Tracking systems and decision support tools  Introduction to manual tracking systems | Level 3  Level 1  Level 1 |  |  |
| Equipment performance monitoring  Normal operation expectations  Troubleshooting | Level 2 |  |  |
| Evolving technologies used in VTS  New technologies as appropriate | Level 1 |  |  |
|  |  | Total 39 +4 hours | Total 6 + 11 hours |

DETAILED TEACHING SYLLABUS OF MODULE 5

1. Detailed teaching syllabus – Equipment

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| Telecommunications | R34 |  |
| Fax  Explain and demonstrate the transmission and reception of facsimile message |  |  |
| Telephone  Describe the operation of different telephone systems/technologies and their functionalities  State the necessity of prioritisation |  |  |
| Telex  Explain the fundamental operation of telex  Describe how to transmit/receive telex messages |  |  |
| E-mail  Explain the fundamentals electronic mail  Demonstrate how to transmit/receive E-mail |  |  |
| Electronic messaging  Discuss and explain the evolving electronic messaging system |  |  |
| Radar, audio, video and other sensors | R34, R41, R49, R57 |  |
|  |  |  |
| Describe the function and different types of audio equipment  VHF radio  Telephone system |  |  |
|  |  |  |
| Describe the function of and different types recording/replay equipment  Audio recording  Video recording  Data recording  Synchronization for replay |  |  |
|  |  |  |
| VHF/Direction finding (VHF/DF) | R34, R49 |  |
| Describe the purpose and basic principles of VHF/Direction finding |  |  |
| State the accuracies of VHF/DF bearings |  |  |
| Tracking systems | R49 |  |
| Explain the principles of radar tracking and Automatic Radar Plotting Aid (ARPA)  ARPA theory  Vector analysis  Limitations and capabilities  Tracking tags  Information available  Limitations/dangers |  |  |
| Explain the application of manual tracking systems  Strips  Cards  Electronic strips and information management  Ship movement reports |  | E2 |
| Describe the application of Automatic Identification Systems (AIS) for tracking  Modes of operation of AIS | R18, R25, R31, R34, R51, R53, R56 |  |
| Information management | R41 |  |
| Explain and demonstrate the use Vessel Traffic Management Information Systems (VTMIS)  Introduction to VTMIS  Co-ordination of information with users/allied services |  |  |
| List and describe the relevance of vessel information  Prioritising of participating vessels  Anticipating calls using radar images  Information from ships - name, call sign, type, position, speed, destination, ETA, special reports  Information to ships - content, timely, relevant |  |  |
| Identify and describe the different allied services within a VTS area  Information from allied services  Information to allied services - content, timely, relevant |  |  |
| Equipment performance monitoring | R34 |  |
| Describe the expected normal operating parameters of equipment  Describe and demonstrate the different troubleshooting methods |  |  |
| Evolving technologies |  |  |
| Describe new technologies, as appropriate |  |  |

From original module 6 – VHF radio

|  |  |  |
| --- | --- | --- |
| VHF radio systems and their use in VTS |  |  |
| *Describe VHF radio systems and their use in VTS* |  |  |
| Frequencies in the international VHF maritime mobile band  Single frequency and two frequency channels  Simplex working  Semi duplex  Duplex working  Port operation and ship movement frequencies  Distress, safety and calling frequencies  Radiotelephone  DSC  Automatic Identification Systems (AIS)  Introduction to AIS  Application of AIS to VTS | R10, Appendix S18 |  |
| Restrictions on the use of Radio Regulations (RR) Appendix S18 frequencies | R10, Appendix S18 |  |
| National frequencies assigned to VTS  Assignment and use of single and two frequency channels for VTS purposes  National restrictions on the use of RR Appendix S18 frequencies | R37 |  |
| Operation of radio equipment |  |  |
| Describe and demonstrate the operation of radio equipment |  |  |
| Introduction to basic VTS VHF radiotelephone, DSC and AIS equipment  Principles, controls and operation of VHF  Channel spacing  Modulation  Range | R35 | A12 or A13,  E1, E5 |
| Principles, controls and operation of DSC  Format of a transmission sequence  Message composition  Error checks  Principles, controls and operation of AIS  Format of a transmission sequence  Message composition  Automatic and manual modes | R34  R29  R30  R18, R25, R34, R31, R47, R51, R53 |  |























PERSONAL ATTRIBUTES

INTRODUCTION

Instructors for this module should have experience of human relationships in the VTS field. If this cannot be achieved, then an appropriate expert should cover certain sections of this module.

In addition, instructors of other modules should continuously monitor the personal attributes of trainees and, when appropriate, draw their attention to the need to meet the learning objectives of this module.

SUBJECT FRAMEWORK

Scope

This syllabus addresses the requirement for VTS Operators to perform their duties properly 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.

Aims

On completion of the course trainees will have the knowledge and ability to conduct their duties in a manner which conforms to accepted principles and procedures established by the Competent Authority concerned.

SUBJECT OUTLINE OF MODULE 6

1. Subject outline – Personal attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| Interaction with others and human relation skills  Public relations  Establishing and sustaining a good working relationship with VTS stakeholders  Negotiations with VTS stakeholders  Successful conflict resolution | Level 2 |  |  |
| Responsibility and reliability  Punctuality  Attentiveness  Importance of maintaining the trust of all VTS stakeholders | Level 4 |  |  |
| Fatigue Management and Shiftwork  Safety and Health awareness  Stress and fatigue  Managing fatigue  Shiftwork and rosters |  |  |  |
| Teamwork  Team working skills  Port resource management  Leadership/followership |  |  |  |
|  |  | Total 6 hours | Total 4 hours |

DETAILED TEACHING SYLLABUS OF MODULE 6

1. Detailed teaching syllabus – Personal attributes

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| Interaction with others and human relation skills |  |  |
| *Have the knowledge and ability to conduct their duties in a manner which conforms to accepted principles and procedures.* |  |  |
| Describe public relations policy  General introduction to the maintenance of good public relations.  The media and press and their requirements.  Information that can be provided to others and the manner of its release.  Dealing with traumatised individuals. |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Responsibility and reliability |  |  |
| Explain the role of health and safety performing the VTS mission  Personal safety  Safety of VTS stakeholders  Personal health  Substance abus**e** |  |  |
| Cite the reasons for time management  Relief of watch  Planning  Reducing fatigue |  |  |
| Describe how professionalism and mission focus is important  Working climate  Team spirit  Awareness of personal circumstances |  |  |

EMERGENCY SITUATIONS

INTRODUCTION

Instructors for this module should have the knowledge, comprehension and the ability to apply emergency practices and procedures in a VTS environment. If this cannot be achieved, then the appropriate expert should cover certain sections of this module. Every instructor should have full access to simulated VTS. In addition, arrangements should be made for trainees to visit operational VTS centres and Rescue co-ordination centres, if conditions allow it.

SUBJECT FRAMEWORK

Scope

This syllabus covers the requirement for VTS Operators to be able to respond rapidly and effectively to emergency situations that may arise within a VTS area.

This course covers the theory and practice of responding to emergency situations and wherever practicable, maintaining an efficient flow of marine traffic while the emergency situation is being dealt with. It also provides knowledge and comprehension of the co-ordination necessary to minimise the effect of any emergency situation.

Aims

On completion of the course trainees should have knowledge of related national and international regulations and procedures relating to emergency situations, security alerts, pollution response and other special circumstances. They should also have the ability to identify properly the type and scale of an emergency, activate the relevant contingency plan, ensure the protection of the VTS area and, as far as practicable, maintain a safe flow of marine traffic.

The trainees should also have sufficient understanding and practice to be able to co-ordinate effectively with allied services, particularly search and rescue authorities.

Trainees should be given realistic exercises on the role of VTS during emergency situations within a VTS area. Integrated exercises on handling emergency situations should also be carried out.

SUBJECT OUTLINE OF MODULE 7

1. Subject outline – Emergency situations

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
|  |  |  |  |
| Contingency plans  Introduction, preparation and implementation of contingency planning  Preparation and use of checklists | Level 2 |  |  |
| Prioritise and respond to situations  Ascertain nature of incident  Commence alerting procedures  Navigational warnings  Co-ordination with, and support to, allied services  Maintaining communications  Updating of situation reports | Level 3 |  |  |
| Record activities concerning emergencies  Objective of recording activities during emergency situations  Introduction to methods of recording activities during emergency situations  Information which should be recorded  security of recorded information | Level 3 |  |  |
| Maintain a safe waterway throughout emergency situations  Maintaining traffic management and monitoring procedures | Level 3 |  |  |
| Internal/external emergencies  Procedures for individual emergencies  Maintenance of VTS Operations | Level 3 |  |  |
|  |  | Total 12 hours | Total 10 hours |

DETAILED TEACHING SYLLABUS OF MODULE 7

1. Detailed teaching syllabus – Emergency situations

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| International, regional and local regulations |  |  |
| *Explain national and international regulations and procedures relating to emergency situations, security alerts, pollution response and special circumstances* |  |  |
| Scope of responsibilities and authority to act in emergency situations  (local/regional/national/international) | R5, R6, R7, R13, R24, R28, R35, R38, R39, R40 |  |
| Local regulations, bye laws  Supporting and allied services  Define the supporting and allied services which are available  Define the assets which are available for deployment | R35 |  |
| **Contingency plans** |  |  |
| *Describe the preparation and implementation of contingency plans* |  |  |
| Introduction, preparation and implementation of contingency plans  Collisions  Groundings  Marine pollution (air/water)  Fire  Hazardous cargoes  SAR incidents, including man overboard  Other contingency plans including, but not limited to the following: medical, casualty evacuation, special weather conditions  Organisations to be alerted  Simultaneous emergencies | R13, R35, R36, R38, R39, R40, R41 |  |
| Describe thepreparation and use of checklists  Introduction and use of checklists  Description of a checklist  Authority to prepare, implement, issue and update checklists | R37 |  |
| Prioritise and respond to incidents | R13, R41, R58 | A14 |
| *Explain the steps in classification of an emergency situation and explain the activation of the relevant contingency plans* |  |  |
| Prioritise incident:  - Data collection  - Evaluation  - Classification of incident  Response planning and action:  - Commence alerting procedures  - Maintaining safe and efficient flow of traffic  - Co-ordination with, and support to, allied services  - Updating of situation reports  - Navigational warnings (if required)  May include but not be limited to:  - Collisions  - Groundings  - Marine Pollution  - Fire  - Hazardous cargoes  - SAR incidents  - Other special circumstances | R13, R23, R28, R35, R37, R41, R53, R55, R58 |  |

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  | R17, R53, R55 |  |
| Maintain a safe waterway throughout emergency situations | R35, R37, R41, R58 | A14 |
| *Describe the actions required to ensure the protection of the VTS area and, as far as practicable, maintain a safe and efficient flow of traffic* |  |  |
| Maintaining traffic management and monitoring procedures  Alternative routing arrangements  Diversionary procedures (traffic in immediate incident area)  Anchorage areas  Introduction of emergency speed restrictions  Emergency alterations to VTS sailing/route plans and passage plans |  |  |
| Internal/external emergencies | R35, R37, R41, R58 |  |
| *Describe the procedures for dealing with internal/external emergencies affecting normal operations of a VTS centre* |  |  |
| Procedures for individual emergencies  Checklists  Maintenance of VTS Operations  Communications  Traffic image |  |  |

1. VTS Operator Competence chart

| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating competence | Criteria for evaluating competence |
| --- | --- | --- | --- |
| **Module 1**  Language | *English Language and language authorised by the Government*  Adequate knowledge of the English language and the language authorised by the Government to enable the operator to use charts, nautical publications and regulations; to understand meteorological, waterway, port management and safety information and to communicate with other ships, shore facilities and agencies.  Ability to use and understand the IMO Standard Marine Communication Phrases | Examination and assessment of evidence obtained from practical instruction.  Standard language assessment as used by the Government, see Annex 3 – Example of English language tests. | English language publications, regulations and messages relevant to the safety of the VTS area are correctly interpreted or drafted.  Written and verbal reports regarding vessels and shore facilities relating to the VTS area are correctly interpreted or drafted.  Communications by any means are clear and understood.  Written reports  Oral communication (articulation and enunciation)  Reading skills |
| **Module 2**  Traffic management | *Regulatory requirements*   1. relevant national and international regulations; 2. implications of legal liabilities related to VTS functions; 3. safety related ship certificates. | Examination and assessment of evidence obtained from practical instruction and on the job training | Legislative requirements relating to the VTS area and the protection of the marine environment are correctly identified |
|  | *VTS environment*   1. traffic patterns; 2. VTS area. | Examination and assessment of evidence obtained from practical instruction and approved simulator and on the job training | Demonstrate the ability to carry out the task safely and effectively |
|  | *Traffic monitoring and organisation*  Thorough knowledge of relevant national and international regulations, procedures, equipment, skills and techniques involved in monitoring and organising vessel traffic. | Examination and assessment of evidence obtained from simulated and on the job training for the following traffic configurations   1. off-shore; 2. coastal; 3. harbour approach and ports; 4. inland waterway. | Demonstrate a knowledge of the VTS operational area, including geographical features, traffic routing measures and aids to navigation  Demonstrate a knowledge of the procedures for maintaining a safe and efficient waterway |

|  |  |  |  |
| --- | --- | --- | --- |
| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating competence | Criteria for evaluating competence |
| **Module 3**  Equipment | *Basic equipment*   1. Telecommunications; 2. Radar; 3. Audio/video; 4. VHF/DF; 5. Performance monitoring. | Examination and assessment of evidence obtained from practical instruction and approved simulator and on the job training | Demonstrate the ability to operate the equipment safely and effectively and to monitor its performance.  Information obtained from the equipment and associated features is correctly interpreted and analysed taking into account the limitations of the equipment and prevailing circumstances and conditions |
|  | *Basic systems*   1. Computerised; 2. Management information; 3. Manual tracking; 4. Radar tracking. | Assessment of evidence obtained from approved simulated and on the job training. | Demonstrate the ability to operate the systems safely and effectively.  Information obtained from the systems and associated features is correctly interpreted and analysed taking into account the limitations of the system and prevailing circumstances and conditions |
|  | *Evolving technologies*   1. ECS; 2. VTMIS; 3. AIS. | Assessment of evidence obtained from approved simulated and on the job training. | Demonstrate the ability to understand the techniques and to operate the equipment safely and effectively |

| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating competence | Criteria for evaluating competence |
| --- | --- | --- | --- |
| **Module 4**  Nautical knowledge | *Carry out chartwork*  Knowledge of and ability to use navigational charts and related publications   1. Chart information and terminology; 2. Plotting positions on charts; 3. True and magnetic courses; 4. Course/speed/distance/time calculations; 5. Tides and currents; 6. Traffic patterns; 7. Charts and publications corrections. | Examination and assessment of evidence obtained from practical instructions and approved simulated and on the job training using chart catalogues, charts and navigational publications | The information obtained from navigational charts and publications is relevant, interpreted correctly and properly applied.  Tools associated with chart work are properly manipulated, work carried out on the chart is easily interpreted and adheres to indicated standards.  Calculations and measurements of navigation information are accurate. |
|  | *Collision regulations*  Understanding of the content, application and intent of the International Regulations for Preventing Collisions at Sea (COLREGS). | Examination and assessment of evidence obtained from practical instruction and approved simulated and on the job training | Demonstrate the ability to interpret the application of the regulations relevant to a VTS area. |
|  | *Aids to Navigation*  Knowledge of various buoyage systems and electronic aids to navigation systems. | Examination and assessment of evidence obtained from practical instruction and approved simulated and on the job training. | Demonstrate the ability to interpret the effect of aids to navigation on the traffic flow in a VTS area. |
|  | *Navigational aids*  Basic understanding of Shipboard Navigational Equipment and electronic means of navigation (Radar, Compasses, ECDIS, ECS, etc.) | Assessment of evidence obtained from approved simulated and on the job training. | Demonstrate the ability to interpret the effect of aids to navigation on the traffic flow in a VTS area. |
|  | *Shipboard Knowledge*  Basic understanding of:   1. Ship terminology; 2. Different types of ships and cargo, including dangerous goods codes; 3. Ship stability; 4. Propulsion systems; 5. External forces; 6. Vessel bridge procedures. | Examination and assessment of evidence obtained from practical instruction and approved simulated and on the job training. | Demonstrate the ability to assimilate all available information relevant to ship design, meteorological and hydrographic conditions that may influence the flow of traffic within a VTS area |
|  | *Port operations*  Knowledge of port operations.  Knowledge of and ability to coordinate information relating to:   1. Pilotage; 2. harbour operations (including contingency plans); 3. security; 4. tugs and towing; 5. ships agents; 6. other allied services. | Examination and assessment of evidence obtained from practical instruction and approved simulated and on the job training | Demonstrate the ability to assimilate all available information relevant to port operations and allied services that may influence the flow of traffic within a VTS area |

|  |  |  |  |
| --- | --- | --- | --- |
| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating competence | Criteria for evaluating competence |
| **Module 5**  Communication  co-ordination | *General communication skills*  Knowledge of:   1. aspects of inter personal communication; 2. problems which can block or hinder the communication process; 3. the difference between verbal and non-verbal aspects of communication; 4. cultural aspects that can hinder the acquisition of a common understanding of messages communicated. | Assessment of skills in overcoming communication problems intentionally introduced in a simulated environment | Demonstrate the ability to avoid the introduction of communication problems and to overcome such problems when they are experienced |
|  | *Co-ordinate various communications between marine and marine related agencies.*   1. Routine; 2. Emergency; 3. Support functions. | Assessment of evidence obtained from approved simulated and on the job training | Demonstrate the ability to prioritise, relay and co-ordinate various communications between marine and marine related agencies, both on board participating vessels and in shore facilities |
|  | *Log keeping*   1. Manual; 2. Electronic. | Assessment of evidence obtained from approved simulated and on the job training | Demonstrate the ability to accurately maintain Logs |
| **Module 6**  VHF Radio | *Transmit and receive information using VHF radio equipment*   1. Radio operator practices and procedures; 2. VHF radio systems and their use in VTS; 3. Operation of radio equipment; 4. Communication procedures, including SAR. | Examination and assessment of evidence obtained from practical demonstration of operational procedures using:   1. approved equipment; 2. communication simulator; where appropriate 3. radio communication laboratory equipment, where appropriate. | Transmission and reception of communications comply with international regulations and procedures and are carried out efficiently and effectively.  English language messages relevant to the VTS area are correctly handled. |

| Competence Area | Knowledge, understanding and proficiency | Methods for demonstrating competence | Criteria for evaluating competence |
| --- | --- | --- | --- |
| **Module 7**  Personal attributes | *Diplomacy*  Knowledge of, and ability to perform:   1. public relations; 2. operational telephone conversations; 3. negotiations with other interested parties. | Assessment of evidence obtained from approved simulated and on the job training. | Conduct conforms to acceptable principles, including confidentiality, and procedures established by the Competent Authority concerned. |
|  | *Time management*  Demonstrate skills required to perform and prioritise multiple and varying tasks  Demonstrate initiative and critical thinking skills in dealing with unexpected circumstances | Assessment of evidence obtained from approved simulated and on the job training. | Conduct conforms to acceptable principles and procedures established by the Competent Authority concerned. |
|  | *Reliability*  Demonstrate   1. punctuality; 2. thoroughness; 3. decisiveness. | Assessment of evidence obtained from approved simulated and on the job training | Conduct conforms to acceptable principles and procedures established by the Competent Authority concerned. |
|  | *Stress management*  Demonstrate decision making skills when dealing with routine situations, emergency situations, panic stricken people and other unexpected circumstances. | Assessment of evidence obtained from approved simulated and on the job training | Conduct conforms with acceptable principles and procedures established by the Competent Authority concerned. |
| **Module 8**  Emergency situations | *Response to contingency plans*  Knowledge of related national and international regulations concerning distress, pollution prevention and special circumstances and demonstrate the ability to:   1. prioritise and respond to situations; 2. commence alerting procedures; 3. co-ordinate with allied services; and 4. record activities.   while continuing to maintain a safe waterway in all aspects. | Assessment of evidence obtained from approved simulated and on the job training. | Type and scale of emergency properly identified.  Activate the relevant contingency plan appropriate.  Actions undertaken ensure the protection of the VTS area and, as far as practicable, maintain a safe flow of marine traffic |

1. Teaching aids and references

**Teaching aids that the participants ideally should have access to:**

A1 Simulated VTS environment capable of meeting the training objectives

A2 Briefing/debriefing area for simulations, including facilities for modelling performance and reviewing recorded exercises

A3 Charts and associated publications

A4 Examples of Notices to Mariners applicable to a VTS area

A5 Ship models

A6 Video recording and playing facilities

A7 Audio recording and playing facilities

A8 Interactive language laboratory

A9 Personal computer

A10 Simulator exercises to practice operational maritime English

A11 Examples of equipment and systems capable of being manipulated in a manner similar to the equipment and systems used in VTS centres

A12 Interactive VTS simulator, including VHF facilities

A13 Simulated VHF DF system including digital selective calling facilities

A14 Appropriate video films;

A15 Manuals, strip cards and other facilities for use with the monitoring systems being taught

A16 Appropriate interactive video

A17 Guest speakers

A18 Case studies

**Equipment recommended for each participant:**

E1 Headset/microphone with press to talk (PTT) facilities

E2 Logging system

E3 For chartwork exercises, desks approximately 1 metre long by 0.7 metres width, with drawers for chart stowage

E4 Protractor, parallel ruler, dividers, nautical almanac, charts of a VTS area, calculator, chart correcting facilities

E5 Audio tapes of recorded VTS communications

**References relevant to the planning of VTS training:**

R1\* SOLAS’ 74 Regulation V/10 – Ships’ routeing

R2\* SOLAS ’74 Regulation V/11 - Ship reporting systems

R3\* SOLAS ’74 Regulation V/12 - Vessel traffic services

R4\* SOLAS ’74 Regulation V/27 - Nautical charts and nautical publications

R5\* SOLAS ’74 Regulation V/7 – Search and rescue services

R6\* United Nations Convention on the Law of the Sea (UNCLOS)

R7\* International Regulations for Preventing Collisions at Sea, 1972 (COLREGS)

R8\* International Maritime Dangerous Goods Code (IMDG Code)

R9\* International Convention on Standards of Training, Certification and Watchkeeping of Seafarers, 1978, as amended in 1995 (STCW Convention)

R10\* Seafarer’s Training, Certification and Watchkeeping Code (STCW 95 Code)

R11\* IMO GMDSS Manual

R12\* IMO publication on Ships’ Routeing

R13\* IMO/ICAO Publication “International Aeronautical and Maritime Search and Rescue (IAMSAR) manual” - in three volumes:

Vol 1 – Organization and management (IMO 960)

Vol 2 – Mission co-ordination (IMO 961)

Vol 3 – Mobile facilities (IMO 962)

R14\* IMO Assembly resolution A.705(17), Promulgation of Maritime Safety Information (MSI)

R15\* IMO Assembly resolution A.772(18), Fatigue factors in manning and safety

R16\* IMO Assembly resolution A.851(20), General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants

R17\* IMO Assembly resolution A.857(20), Guidelines for Vessel Traffic Services

R18\* IMO Assembly resolution A.917(22), as amended by resolution A.956(23) on Guidelines for the onboard operational use of shipborne automatic identification systems (AIS)

R19\* IMO Assembly resolution A.918(22), Standard Marine Communication Phrases

R20\* IMO Assembly resolution A.950(23), Maritime Assistance Service (MAS)

R21\* IMO Assembly resolution A.954(23), Proper use of VHF channels at sea

R22\* IMO Maritime Safety Committee resolution MSC.232(82), Revised performance standards for Electronic Chart Display and Information Systems (ECDIS)

R23\* IMO COMSAR/Circ.15 - Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI)

R24\* IMO MSC/Circ.1014, Guidelines on fatigue mitigation and management

R25\* IMO SN/Circ.244, Guidance on the use of the UN/Locode in the destination field in AIS messages

R26\* International Code of Signals

R27 IHO approved documents of charts and publications

R28 ITU Radio Regulations, including Appendices

R29 ITU-R Recommendation M.493, DSC for use in the maritime mobile services

R30 ITU-R Recommendation M.541, Operational procedures for the use of DSC equipment in the maritime mobile services

R31 ITU-R Recommendation M.1371, Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band

R32 IELTS Handbook - British Council, or equivalent.

R33 Marine Communications Handbook - Lloyds of London

R34 Equipment and system operating manuals

R35 National, regional and local legislation and regulations on VTS, ports, harbours, pilotage and allied services

R36 National Notices to Mariners pertaining to VTS

R37 National procedures and standards for operation of VTS

R38 National procedures and standards for operation of International Convention for the Prevention of Pollution from Ships (MARPOL)

R39 National arrangements for intervention, pollution and salvage

R40 Local/regional contingency and emergency requirements

R41 IALA Vessel Traffic Services Manual

R42 IALA Aids to Navigation Guide (NAVGUIDE)

R43 International Maritime Buoyage System (MBS), published by IALA

R44 IALA Recommendation V-103, Standards of training and certification of VTS Personnel

R45 IALA Recommendation V-119, Implementation of Vessel Traffic Services

R46 IALA Recommendation V-120, Vessel Traffic Services in Inland Waters

R47 IALA Recommendation V-125, The Use and Presentation of Symbology at a VTS Centre (including AIS)

R48 IALA Recommendation V-127, Operational procedures for Vessel Traffic Services

R49 IALA Recommendation V-128, Operational and technical performance requirements for VTS equipment

R50 IALA Guideline 1017, Assessment of Training Requirements for Existing VTS Personnel, Candidate VTS Operators and Revalidation of VTS Operator Certificates

R51 IALA Guideline 1026, AIS as a VTS tool

R52 IALA Guideline 1027, Designing and implementing simulation in VTS Training at Training Institutes/VTS Centres

R53 IALA Guidelines 1028, The Automatic Identification System (AIS) Volume 1, Part I Operational Issues

R54 IALA Guideline 1032, Aspects of Training of VTS Personnel relevant to the introduction of the Automatic Identification System

R55 IALA Guideline 1045, Staffing levels at VTS centres

R56 IALA Guideline 1050, Management and Monitoring of AIS Information

R57 IALA Guideline 1056, Establishment of VTS Radar Services (Ed 1)

R58 IALA Guideline 1068, Provision of a Navigational Assistance Service by Vessel Traffic Services

R59 IALA Guideline 1070, VTS role in managing Restricted or Limited Access Areas

R60 IALA Guideline 1071, Establishment of a Vessel Traffic Service beyond territorial seas

\*There is an annual catalogue of IMO Publications, many of which are printed in languages other than English. The catalogue provides ISBN and IMO references to these publications and the price, together with order forms which may be faxed. Additionally, training organisations and course co-ordinators should note that groups of publications are also made available online, and may be a more convenient method of obtaining some of the data that they require.

The catalogue contains a list of national distributors who maintain stocks of IMO Publications.

The IMO Publications catalogue is available free of charge from:

IMO Publishing Service

4 Albert Embankment

LONDON SE1 7SR Tel: +44 (0) 20 7735 7611

United Kingdom Fax: +44 (0) 20 7587 3241

e-mail: [sales@imo.org](mailto:sales@imo.org) <http://www.imo.org>

1. Example of English Language Tests

In the United States of America the Test of English as a Foreign Language (TOEFL) is used and in the United Kingdom the International English Language Testing System (IELTS) is used. Other countries also have similar testing systems.

IELTS, which is jointly managed by the University of Cambridge Local Examinations Syndicate, the British Council and IDP Education Australia, provides an assessment of whether candidates are ready to study or train in the medium of English. It is recognised widely as a language requirement for entry to courses in teaching of English further and higher education. It is readily available at test centres around the world, which arrange test administration according to local demand.

The IELTS system uses band scores that are recorded on a test report form showing overall ability as well as performance in listening, reading, writing and speaking. There are 9 bands ranging from:

Band 1 - “Non-user” For a person who essentially has no ability to use the language beyond possibly a few isolated words; to,

Band 9 - “Expert user” For a person with full operational command of the language; with complete understanding, and who uses the language appropriately, accurately and fluently.

IELTS is a test for general English and the nearest test considered applicable for trainee VTS Operators is that for General Training. It is recommended that the overall ability level be IELTS Band 5, Modest User, or the equivalent in similar testing systems.

Modest User is defined as:

*Has partial command of the language, coping with overall meaning in most situations, though is likely to make many mistakes. Is not able to use complex language.*