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| IALA Model Course |

V-103/1

Vessel Traffic Services Operator Training

This draft revision of V-103/1 is provided for the convenience of the VTS Committee.

Sections 4-7 highlighted in yellow are not in the presently published version of V-103/1. However this is the layout of all other Model Courses. All other text is exactly as published in the present Ed.2.

The Committee is invited to include, remove or relocate these sections they wish.

Edition 2.0

December 2009

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

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| Date | Page / Section Revised | Requirement for Revision |
| March 1988 | 1st issue |  |
| December 2005 | Ed.1.1 |  |
| December 2009 | Ed.2  Entire document | Reflecting 10 years’ experience and the evolution of technology |
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FOREWORD

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

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

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

* Model Course V-103/1 - VTS Operator Training
* Model Course V-103/2 - VTS Supervisor Training
* Model Course V-103/3 - VTS On-the-Job Training
* Model Course V-103/4 - VTS On-the-Job Training Instructor

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

The Dean

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

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

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

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

1. COURSE OVERVIEW

# OVERVIEW

IALA recommends that training providers utilise accredited training courses as per IALA Guideline 1014 on the Accreditation of VTS Training Courses.

# PURPOSE OF THE MODEL COURSE

The purpose of the model course is to assist maritime training organisations and their teaching staff in the preparation and introduction of new training courses for VTS Operators, or in enhancing, updating or supplementing existing training material where the quality and effectiveness of the training courses may thereby be improved.

This course provides details of the subject areas for knowledge and practical competence required for a VTS trainee to gain a course certificate as part of the qualification for becoming a VTS Operator.

# USE OF THE MODEL COURSE

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

The course also provides participants with the opportunity to exercise the role of a VTS Operator. These exercises should, wherever practicable, use simulation. Where simulation is not practicable, the exercises should be designed to be fully representative of appropriate situations that occur in a VTS.

The following sections hightlighted yellow are part of the new template for Model Courses. The Committee is invited to use or remove these sections as appropriate.

# TEACHING AIDS

Teaching aids that 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 like 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

Equipment that participants should have access to:

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

E2 Logging system

E3 Desks approximately 1 metre long by 0.7 metres width, with drawers for chart stowage (Chart work exercises)

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

E5 Audio tapes of recorded VTS communications

# ACRONYMS

AIS Automatic Identification System(s)

APL Accredited Prior Learning

ARPA Automatic Radar Plotting Aid

CCTV Close circuit television

CD-ROM Compact Disc – Read only memory

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

WIG Wing in ground

# REFERENCES RELEVANT TO THE PLANNING OF VTS TRAINING

1. SOLAS’ 74 Regulation V/10 – Ships’ routeing\*
2. SOLAS ’74 Regulation V/11 - Ship reporting systems\*
3. SOLAS ’74 Regulation V/12 - Vessel traffic services\*
4. SOLAS ’74 Regulation V/27 - Nautical charts and nautical publications\*
5. SOLAS ’74 Regulation V/7 – Search and rescue services\*
6. United Nations Convention on the Law of the Sea (UNCLOS)\*
7. International Regulations for Preventing Collisions at Sea, 1972 (COLREGS)\*
8. International Maritime Dangerous Goods Code (IMDG Code)\*
9. International Convention on Standards of Training, Certification and Watchkeeping of Seafarers, 1978, as amended in 1995 (STCW Convention)\*
10. Seafarer’s Training, Certification and Watchkeeping Code (STCW 95 Code)\*
11. IMO GMDSS Manual\*
12. IMO publication on Ships’ Routeing\*
13. 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)

1. IMO Assembly resolution A.705(17), Promulgation of Maritime Safety Information (MSI)\*
2. IMO Assembly resolution A.772(18), Fatigue factors in manning and safety\*
3. 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\*
4. RIMO Assembly resolution A.857(20), Guidelines for Vessel Traffic Services\*
5. 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)\*
6. IMO Assembly resolution A.918(22), Standard Marine Communication Phrases\*
7. IMO Assembly resolution A.950(23), Maritime Assistance Service (MAS)\*
8. IMO Assembly resolution A.954(23), Proper use of VHF channels at sea\*
9. IMO Maritime Safety Committee resolution MSC.232(82), Revised performance standards for Electronic Chart Display and Information Systems (ECDIS)\*
10. IMO COMSAR/Circ.15 - Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI)\*
11. IMO MSC/Circ.1014, Guidelines on fatigue mitigation and management\*
12. IMO SN/Circ.244, Guidance on the use of the UN/LOCODE in the destination field in AIS messages\*
13. International Code of Signals\*
14. IHO approved documents of charts and publications
15. TU Radio Regulations, including Appendices
16. ITU-R Recommendation M.493, DSC for use in the maritime mobile services
17. ITU-R Recommendation M.541, Operational procedures for the use of DSC equipment in the maritime mobile services
18. ITU-R Recommendation M.1371, Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band
19. IELTS Handbook - British Council, or equivalent
20. Marine Communications Handbook - Lloyds of London
21. Equipment and system operating manuals
22. National, regional and local legislation and regulations on VTS, ports, harbours, pilotage and allied services
23. National Notices to Mariners pertaining to VTS
24. National procedures and standards for operation of VTS
25. National procedures and standards for operation of International Convention for the Prevention of Pollution from Ships (MARPOL)
26. National arrangements for intervention, pollution and salvage
27. Local/regional contingency and emergency requirements
28. IALA Vessel Traffic Services Manual
29. IALA Aids to Navigation Guide (NAVGUIDE)
30. International Maritime Buoyage System (MBS), published by IALA
31. IALA Recommendation V-103, Standards of training and certification of VTS Personnel
32. IALA Recommendation V-119, Implementation of Vessel Traffic Services
33. IALA Recommendation V-120, Vessel Traffic Services in Inland Waters
34. IALA Recommendation V-125, The Use and Presentation of Symbology at a VTS Centre (including AIS)
35. IALA Recommendation V-127, Operational procedures for Vessel Traffic Services
36. IALA Recommendation V-128, Operational and technical performance requirements for VTS equipment
37. IALA Guideline 1017, Assessment of Training Requirements for Existing VTS Personnel, Candidate VTS Operators and Revalidation of VTS Operator Certificates
38. IALA Guideline 1026, AIS as a VTS tool
39. IALA Guideline 1027, Designing and implementing simulation in VTS Training at Training Institutes/VTS Centres
40. IALA Guidelines 1028, The Automatic Identification System (AIS) Volume 1, Part I Operational Issues
41. IALA Guideline 1032, Aspects of Training of VTS Personnel relevant to the introduction of the Automatic Identification System
42. IALA Guideline 1045, Staffing levels at VTS centres
43. IALA Guideline 1050, Management and Monitoring of AIS Information
44. IALA Guideline 1056, Establishment of VTS Radar Services (Ed 1)
45. IALA Guideline 1068, Provision of a Navigational Assistance Service by Vessel Traffic Services
46. IALA Guideline 1070, VTS role in managing Restricted or Limited Access Areas
47. 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 on CD-ROM, 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. DELIVERY OF THE MODEL COURSE

# INTRODUCTION

All training and assessment of personnel for gaining the course certificate as part of the qualification towards becoming a VTS Operator should be:

1. Structured in accordance with written programmes, including such methods and means of delivery, procedures and course material as are necessary to achieve the prescribed standard of competence; and,
2. Conducted, monitored, assessed and supported by persons qualified in accordance with Part C, section 4 Training Staff Requirements.

Training staff should review the course outline and detailed syllabus in each subject. The actual level of knowledge, skills and prior technical education of the participants in the subject concerned should be kept in mind during this review. Any differences between the level of skills and competencies of the participant and those identified within the detailed training syllabus should be identified. To compensate for such differences, the instructor is expected to delete from the course, or reduce the emphasis on, items dealing with knowledge or skills already attained by the participants. The instructor should also identify any academic knowledge, skills or technical training that the participants may not have acquired.

By analysing the detailed syllabus and the academic knowledge required to allow training in the technical area to proceed, the instructor can design an appropriate pre-entry course in the subjects in which weakness is evident. Alternatively, the elements of academic knowledge required to support the technical training elements concerned may be inserted at appropriate points within the syllabus.

Adjustment of the module objectives, scope and content for each subject may also be necessary if the participants completing the course are to undertake duties which differ from the objectives specified.

# COURSE MODULES

The modular presentation enables the instructor to adjust the course content to suit the participant intake and provide any revisions of the subject objectives as required. The instructor should draw up lesson plans based on each detailed syllabus and the references in them to the textbooks and teaching material suggested for the course. Where no adjustment has been found necessary in the subjects of a detailed syllabus, the lesson plans may simply consist of the detailed syllabus with keywords or other reminders added to assist the instructor in making his presentation of the material.

To assist in the development of lesson plans, five levels of competence are used in the model courses for VTS personnel. Levels 1 to 4 are used in the model course for the training of VTS Operators and levels 3 to 5 are used in the model course for VTS Supervisor. See Table 1 in Part D, section 3 – Lesson Plans.

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 Subject Outline of each module.

# SUBJECT OUTLINE

The subject outline of each module also includes a total recommended number of hours that should be allotted to each module. However, it should be appreciated that these allocations are arbitrary and assume that the participants have met fully all the entry requirements specified for each subject. The instructor should therefore review carefully lesson plan design and consider the need to reallocate the time required to achieve each specific learning objective. In addition, the opportunity to reduce formal training time through recognition of Accredited Prior Learning (APL) should be taken advantage of whenever documented evidence of prior learning or professional certification can be produced by the course participants.

# 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 …….*

In preparing a teaching scheme and lesson plans, the instructor is free to use any teaching method or combination of methods that will ensure participants can meet the stated objectives. However, it is essential that participants complete the subject matter set-out in each module.

# PRESENTATION

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

# EVALUATION OR ASSESSMENT OF THE COURSE PARTICIPANTS

The evaluation criteria are contained in column 4 of the VTS Operator competence chart (see ANNEX 1), and provide the means for an assessor to judge whether a participant is competent to perform the related tasks, duties and responsibilities.

# IMPLEMENTATION

For the course to run smoothly and effectively, considerable attention must be paid to the availability and use of:

* qualified instructors;
* support staff;
* rooms and other spaces;
* equipment;
* textbooks, technical papers;
* other reference material.

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

# VALIDATION

The information contained in this document has been validated by a group of technical advisers, consultants and experts on training of VTS personnel. These were drawn from the IALA VTS Committee, training organisations of IALA national members and experienced VTS personnel so that the standards implemented may be as uniform as possible. Validation in the context of this document means that the group has found no grounds to object to its contents.

1. COURSE FRAMEWORK

# INTRODUCTION

The model course covers the requirements of the IALA Recommendation V-103. On successful completion of the course and assessments, the participants should have been provided with sufficient training and to proceed to the next stage of On-the-Job Training (OJT) at a VTS centre.

# REQUIREMENTS FOR ATTAINING THE COURSE CERTIFICATE

Every candidate for a VTS Operator course certificate should:

* have achieved the International English Language Testing System (IELTS) level 5, or its equivalent;
* satisfy the competent/VTS authority by passing the appropriate assessments for the accredited course of operator training and that they possess the theoretical and practical knowledge appropriate to the requirements of a VTS Operator.

# COURSE INTAKE – LIMITATIONS

Class sizes may be limited at the discretion of the Competent Authority to allow the instructor to give adequate attention to individual participants. In general, it is recommended that a maximum of 12-14 participants be the upper limit that a single instructor can be expected to train satisfactorily to the level of competence involved. Larger numbers may be admitted if extra staff and tutorial periods are provided to deal with participants on an individual basis.

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

# TRAINING STAFF REQUIREMENTS

All instructors and assessors should be appropriately qualified for the types and levels of training or assessment required for the model course.

The accredited training programme for VTS Operators should ensure that the qualifications and experiences of instructors and assessors are covered in the application of appropriate quality training standards. Such qualifications, experience and application of quality standards should incorporate appropriate training in instructional techniques, and training and assessment methods and practices, and comply with all applicable recommendations set out in the following paragraphs.

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

## Course instructors

Any person conducting training of personnel qualifying for certification as VTS Operators should:

* have an appreciation of the training programme and an understanding of the specific training objectives for the type of training being conducted;
* be professionally and academically qualified in the task for which training is being conducted;
* have an appropriate balance of professional and teaching qualifications;
* if conducting training with the use of a simulator:
  + have received appropriate guidance in instructional techniques involving the use of simulators;
  + have gained practical operational experience on the simulator being used.

## Course Assessors

Any person conducting assessment of competence of personnel should:

* have an appropriate level of knowledge and understanding of the competence to be assessed;
* be qualified in the task for which the assessment is being made;
* have received appropriate guidance in assessment methods and practices;
* have gained practical assessment experience;
* if conducting assessment involving the use of simulators, have gained practical assessment experience on the type of simulator under the supervision, and to the satisfaction, of an experienced assessor.

# TEACHING FACILITIES AND EQUIPMENT

Facilities other than an ordinary classroom fitted with a chalkboard or whiteboard, an overhead projector or computer-assisted projector and screen are given in the individual subject frameworks.

To assist instructors, references are shown against the subjects in the modules to indicate references and publications, additional technical material and teaching aids that the instructor may wish to use when preparing and presenting the course (see ANNEX 2). The material listed in the subject frameworks has been used to structure the detailed teaching syllabuses:

1. Teaching aids (indicated by A).
2. Equipment needed by participants (indicated by E).
3. References (indicated by R).
4. GUIDELINES FOR INSTRUCTORS

# INTRODUCTION

VTS Operators are appropriately qualified persons performing one or more tasks contributing to the services of a VTS centre. It is essential that education and training be aimed at minimising incidents due to mistakes or errors of judgement. This model course is designed to meet the requirements for trainee VTS Operators to obtain a course certificate leading to on-the-job training.

It is important to keep in mind the close relationship of all subjects in the VTS Operators course. Instructors should continuously monitor the additional personal attributes of participants and, when appropriate, draw their attention to the need to meet the subjects of that module.

In Vessel Traffic Services, new techniques and equipment are developed very quickly. This makes it necessary for instructors to keep up to date in new techniques and in national and international rules and regulations. Instructors should also be encouraged to teach relevant new developments and techniques not mentioned in this syllabus.

# CURRICULUM

The subject modules into which the course is divided reflect the competence headings of the VTS Operator competence chart (see ANNEX 1). The syllabuses are presented this way to show clearly the relationship of the syllabus with the recommendations of the IALA.

The subjects shown in the detailed syllabus are not listed in order of priority. Instructors should treat them in the order, which they consider to be the most effective for their course participants and circumstances.

Great care should be taken when using the levels of competence in Table 1. They have been phrased in a precise form to indicate exactly what the participant should be capable of doing. This then becomes the means of demonstrating that the intended level of knowledge or skill has been attained.

The recommended hours given in the syllabi are intended to be used as approximate guidelines for planning purposes. The hours should be adjusted as necessary to suit local circumstances in the light of experience with previous courses. If possible the course should be implemented with some flexibility to allow for adjustments during its running. It is normal for different participants to require different lengths of time to cover the same work. For practical reasons some minor adjustments will probably be needed when drawing up the timetable to fit the work to be covered into fixed teaching periods and term times.

The success of the course will depend, to a large extent, upon detailed co-ordination of the individual subjects into a coherent teaching scheme. It is important that an experienced instructor acts as course co-ordinator to plan and supervise the implementation of the course.

Using the time estimates, modified as appropriate, a timetable should be drawn up to suit the normal working day and terms of the training organisation. Teaching schemes should be prepared by the teaching staff outlining the subject areas to be covered week by week. All members of the teaching team should have a copy of the proposed schemes so that they are aware of what is being done in subjects other than their own.

The teaching schemes should be scrutinised carefully to ensure that all of the listed subjects are covered, that repetition is avoided and that essential pre-requisite knowledge at any stage has already been covered. Only those additional requirements set by the Competent Authority should be introduced.

The course co-ordinator should monitor the running of the course. There should be regular discussions with the teaching staff involved concerning the progress of participants and any problems that have become apparent. Modifications of the teaching scheme should be made where necessary to ensure that participants are attaining the objectives laid down. If necessary, extra tuition should be arranged to enable weaker participants to reach the required standard. At the conclusion of the course a discussion should be held to determine whether changes should be made to improve future courses.

Procedures should be in place to follow the On-the-Job Training (OJT) of participants, using comments from both participants and OJT Instructors to help ensure relevancy and validity of future courses. The transition from advanced training to OJT should appear as continuous as possible.

# LESSON PLANS

The modular presentation enables the instructor to adjust the course content and provide any revisions of the subject objectives as required. The instructor should draw up lesson plans based on each detailed syllabus and the references in them to the textbooks and teaching material suggested for the course. Where no adjustment has been found necessary in the learning objectives of a detailed syllabus, the lesson plans may simply consist of the detailed syllabus with keywords or other reminders added to assist the instructor in making his presentation of the material.

To assist in the development of lesson plans five levels of competence are used in the model courses for VTS personnel. Levels 1 to 4 are used in the model course for the training of VTS Operators and levels 3 to 5 are used in the model course for advancement to VTS Supervisor.

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 section 3, Subject Outline, of each module.

Section 3, Subject Outline, of each module also includes a recommended assessment of the time that should be allotted to each subject. However, it should be appreciated that these allocations are arbitrary and assume that the trainees have met fully all of the entry requirements specified for each subject. The instructor should therefore review carefully these assessments during course and lesson plan design and consider the need to reallocate the time required to achieve each specific learning objective.

Section 4, Detailed Teaching Syllabus, of each module has been written in learning-objective format in which the objective describes what the trainee 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 trainee has acquired the recommended levels of competence in …….*

In preparing a teaching scheme and lesson plans, the instructor is free to use any teaching method or combination of methods that will ensure trainees can meet the stated objectives. However, it is essential that trainees attain all objectives set out in each syllabus.

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 |

# EVALUATION OR ASSESSMENT

Continual assessment of participants should be undertaken. In many cases the assessment can be based on the marks given to participants’ course work, providing a proper record of it is kept. That can be supplemented by occasional short test papers. These assessments are additional to any examination required for the purposes of certification.

Assessments should use the following five levels to indicate the progressive learning attained by participants. It is recommended that, for the VTS Operator, an average level of one to four should be considered as being 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. |

The form and timing of examinations for endorsement as a VTS Operator is a matter for the Competent Authority concerned.

An adequate period should be allowed at the end of the course for revision and review of the course content. That period and the time occupied by any examinations would be additional to the times shown in the syllabuses.

The Competent Authority may recognize documented evidence including assessments completed for the attainment of related certificates as equivalencies for parts or all specific VTS modules.

# PRACTICAL TRAINING

In addition to subject modules; the following are recommended simulated exercises included assessment criteria and recommended duration in hours.

1. Simulation Exercises

| Subject | Assessment criteria | Hours |
| --- | --- | --- |
| **Basic skills**  Monitoring and identification  Communication co-ordination  Evaluation and interpretation of the traffic situation  Log keeping, recording and reporting | Ability to identify, correctly interpret and handle reports from five simulated vessels. | 20 |
| **Traffic interaction and conflict resolution**  Waterway management in multi-ship scenarios  Anticipation and projection of traffic patterns  Critical areas  Vessels overtaking and approaching each other  VTS sailing/route plans, including those for deep draught vessels | Ability to identify, correctly interpret and deal with up to five simulated vessels in complex situations.  Ability to prepare VTS sailing or route plans, to monitor their execution and amend them due to unforeseen circumstances. | 60 |
| **Emergencies and special situations**  Contingency plans  Adverse weather conditions  Special vessels and those with restricted manoeuvrability  Internal and external emergencies | Ability to identify, correctly interpret data and handle reports from 20 simulated vessels during emergencies and special situations. | 20 |

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 Hours | | Remarks2 | |
| --- | --- | --- | --- | --- |
| Presentations / Lectures | Exercises / Simulation1 |
| 1 – Language3 | 91 | 75 | Language structure  Specific VTS messages construction | Standard phrases  Collecting information |
| 2 – Traffic Management | 52 | 54 | Regulatory requirements  Roles and responsibilities  VTS environment | Principles of waterway and traffic management  Traffic monitoring and organisation |
| 3 – Equipment | 39 | 6 | Telecommunications  Radar, audio, video and other sensors  VHF/Direction finding (VHF/DF)  Tracking systems | Information management  Equipment performance monitoring  Evolving technologies |
| 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 – Communication  Co-ordination | 7 | 11 | General communication skills  Communications | Log and record keeping |
| 6 – VHF Radio | 15 | 42 | Radio operator practices and procedures  VHF radio systems and their use in VTS | Operation of radio equipment  Communication procedures, including SAR |
| 7 – Personal Attributes | 6 | 4 | Interaction with others  Human relation skills | Responsibility and reliability |
| 8 – Emergency Situations | 12 | 10 | International, national, regional, local regulations  Contingency plans  Prioritise and respond to situations | Record activities concerning emergencies  Maintain a safe waterway throughout emergency situations  Internal/external emergencies |
| Total | **307** | **240** |  |  |

*Notes: 1 In addition to the above mentioned recommended duration in hours, see table 3 Simulation exercises in Part D, section 5 Practical training.*

*2. 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.*

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

1. LANGUAGE
   1. INTRODUCTION

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

* + 1. 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 3, Example of English language tests).

* 1. SUBJECT FRAMEWORK
     1. Scope

This syllabus covers the requirement for VTS Operators to have a sufficient knowledge of the English language to be able to use VTS equipment, charts and other nautical publications, understand meteorological and oceanographic information and communicate with ships and allied services for VTS purposes, including the operation of contingency plans.

* + 1. 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.

* 1. SUBJECT OUTLINE OF MODULE 1

1. Subject outline – Language

|  |  |  |  |
| --- | --- | --- | --- |
| **Subject Area** | **Recommended Competence Level** | **Recommended Hours1** | |
| **Presentations/ Lectures** | **Exercises/ Simulation** |
| **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 | Level 4 |  |  |
| **Standard phrases**  The advantages, disadvantages and application of standard phrases  The IMO SMCP in general  The IMO SMCP, part 3, section 6, VTS | Level 2  Level 3 |  |  |
| **Collecting information**  Questioning techniques | Level 2 |  |  |
|  |  | Total 91 hours | Total 75 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.*

* 1. DETAILED TEACHING SYLLABUS FOR MODULE 1 – LANGUAGE

1. Detailed Teaching Syllabus – Language

| **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 |
| Describe the techniques to eliminate ambiguity  ‘Conditional’ words and their elimination in VTS messages  Consequences of misuse of ‘conditional’ words | R19 (VTS section) | A1 or A8 |
| Describe the use of message markers and the meaning they imply  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 Examples from operational VTS | R19 (VTS section), R13 | A1 |
| **Specific VTS message construction** |  |  |
| Construct VTS messages  Practical communications  Examples from ‘Basic English’ and ‘ICAO English’ | R19 | A1 |
| *Explain speech techniques to imply higher message status* |  |  |
| **Standard phrases** | R19 | A1 |
| State the advantages, disadvantages and application of SMCP  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 |  |  |
| Demonstrate the use of IMO Standard Marine Communication Phrases (SMCP).  Introduction to the SMCP - Its overall construction and origins The use of the SMCP on ships, particularly during emergency situations and distress  When and how to use the SMCP in response to ships using the system  Exercise: Use of SMCP in simulation and in actual recorded events |  |  |
| Explain when and how to use the SMCP within a VTS (Part 3, section 6 of the SMCP).  General layout  Exercise: Use of SMCP by a VTS in simulation and recorded VTS events |  |  |
| **Collecting information** | R19 | A1 |
| Describe information collection and 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. |  |  |

1. TRAFFIC MANAGEMENT
   1. 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.

* 1. SUBJECT FRAMEWORK
     1. 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, as well as providing knowledge of applicable international and national regulations and ships’ safety certificates.

* + 1. 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.

* 1. SUBJECT OUTLINE OF MODULE 2

1. Subject outline – Traffic management

| 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 |  |  |
| **Roles and responsibilities**  Ship masters  Marine pilots  VTS  Allied services | Level 1  Level 1  Level 3  Level 1 |  |  |
| **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 |  |  |
| **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 |  |  |
| **Traffic monitoring and organisation**  Traffic patterns  VTS sailing or route plans  Situation analysis | Level 4 |  |  |
|  |  | Total 26 hours | Total 52 hours |

* 1. DETAILED TEACHING SYLLABUS OF MODULE 2

1. Detailed teaching syllabus – Traffic management

| 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* |  |  |
| International regulations  Sources of literature on international legislative requirements  (IMO Resolution 857(20); Ship reporting systems; carriage of dangerous goods; World VTS Guide; etc. |  |  |
| National regulations, including local bye laws  Sources of national legislation and promulgation  Bye laws  Notices to Mariners and other nautical publications |  |  |
| Legal liabilities of VTS functions  Extent of competence, authority and responsibility  Competent authority  VTS authority  Personnel |  |  |
| Carriage of relevant ship certificates |  |  |
| Roles and responsibilities |  |  |
| *Explain the roles, responsibilities of and relationships between ship masters, marine pilots, VTS and allied services* |  |  |
| Ship masters  Responsibility of the ship master  Responsibility of the ship master to VTS |  |  |
| Marine pilots  Responsibility of the pilot to the ship master  Responsibility of the pilot to VTS |  |  |
| VTS  Responsibility to the master and pilot  Responsibility of VTS to allied services |  |  |
| Allied services  Knowledge of allied services (i.e. harbour master, port authority)  Roles of allied services |  |  |
| 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* |  |  |
| Planning  Routeing  Channel geography  Traffic restriction areas  Anchorage areas  Obstructions  Type of traffic  Ship characteristics  Cargo characteristics  Information  Traffic  Waterway (Notice to shipping, regattas)  Environmental (visibility, waterspouts, dust storms, pollution) |  |  |
| Risk management  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 |  |  |
| Allocation of space  Ships domain  Authorising ship movements  Allocation of priorities |  |  |
| Criteria which determine the parameters for the safe passage of shipping  Water reference level  Tide gauges  Correlation between predicted and actual water levels  Allowance for delayed manoeuvres  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  Safe air draft  Factors affecting and sources of information for calculating air draft  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  Shipping movements  Movements authorised only when safe criteria have been determined and conditions satisfactorily met |  |  |
| **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* |  |  |
| Traffic patterns  Normal traffic patterns  Non-routine items affecting traffic patterns (rogue vessels, weather) |  |  |
| VTS sailing or route plan  Developing a plan to ensure safe and efficient movement of vessel traffic |  |  |
| 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 | R7, R41, R35, R36 |  |

1. EQUIPMENT
   1. 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.

* 1. SUBJECT FRAMEWORK
     1. 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.

* + 1. 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.

* 1. SUBJECT OUTLINE OF MODULE 3

1. Subject outline - Equipment

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| Telecommunications  Fax  Telephone  Telex  E-mail  Electronic Messaging | Level 2 |  |  |
| Radar, audio, video and other sensors  Basics of coastal radar and its applications to VTS  Generic VTS radar display features  Audio equipment  Video equipment  Recording/replay equipment  Meteorological and hydrological sensors | Level 1  Level 3 |  |  |
| VHF/Direction finding (VHF/DF)  Purpose and basic principles of VHF/DF  Accuracies of VHF/DF bearings | Level 1 |  |  |
| Tracking systems  Introduction to radar tracking systems and ARPA  Introduction to manual tracking systems  Introduction to use of Automatic Identification Systems (AIS) for tracking | Level 3  Level 1  Level 1 |  |  |
| Information management  VTMIS  Vessel information  Allied services | Level 1 |  |  |
| Equipment performance monitoring  Normal operation expectations  Troubleshooting | Level 2 |  |  |
| Evolving technologies  New technologies as appropriate | Understanding |  |  |
|  |  | Total 39 hours | Total 6 hours |

* 1. DETAILED TEACHING SYLLABUS OF MODULE 3

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 |  |
| Radar  Describe the basics of coastal radar and its applications to VTS  Coastal radar concepts  Application of coastal radar to VTS  Sensor fusion  System warnings  List the features of generic VTS radar display  Detection, acquisition and tracking  VTS traffic image warnings |  |  |
| Describe the function and different types of audio equipment  VHF radio  Telephone system |  |  |
| Describe the function and different types of video equipment  Close circuit (CCTV)  Low light (LLTV)  Infra-red |  |  |
| Describe the function of and different types recording/replay equipment  Audio recording  Video recording  Data recording  Synchronization for replay |  |  |
| Describe the application of meteorological and hydrological equipment  Tide gauges - remote height of tide indicators  Tidal stream indicator - remote indications  Barometer  Temperature/humidity indicators  Anemometers  Visibility |  |  |
| 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 |  |  |

1. NAUTICAL KNOWLEDGE
   1. 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.

* 1. SUBJECT FRAMEWORK
     1. 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.

* + 1. 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.

* 1. SUBJECT OUTLINE OF MODULE 4

1. Subject outline – Nautical knowledge

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| Chartwork  Chart information and terminology  Plotting positions 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 | |

* 1. 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  Use of charts in VTS  Identify and describe chart symbols  Symbols associated with VTS  Importance of symbols in a VTS area  Importance of symbols to the mariner |  |  |
| 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 |  |  |
| Describe the effect of tides and tidal streams  Introduction to tides and tidal stream  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  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  Demonstrate the method of using of tidal streams in calculating an Estimated Position (EP)  Review of Dead Reckoning Position (DR)  Explanation of EP  Effect of tides and currents  Effect of wind/leeway |  |  |
| 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 |
| --- | --- | --- |
| Aids to Navigation |  |  |
| Describe international maritime buoyages  Introduction to the International Maritime Buoyage System  Lateral systems (IALA A & B)  Cardinal systems  Implications of various systems  Regulations pertaining to buoyage systems  Characteristics of floating aids  Types of buoys  Placement of buoys  Fundamental rules for safe navigation  Chart symbols and abbreviations for floating aids  Numbering of aids  Topmarks  Characteristics of fixed aids  Day beacons  Light stations  Ranges  Sector lights  Leading lights  Fog signals | R43  R42  R42 | A1, A2 |
| Explain the functions of radar beacons  Introduction to radar beacons (RACONS /Ramarks)  Purpose  Special characteristics  Recognition and identification  Implications of radar beacons (RACONS/Ramarks)  Limitations  Users | 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 |  |
| Explain the theory and use of virtual aids to navigation  Introduction to and purpose of virtual aids to navigation |  |  |
| Navigational aids (shipborne) |  |  |
| Explain the theory of radar and demonstrate its operation  Use of radars on board ships  Fundamentals of RADAR theory  Radar controls  Factors affecting radar detection  Limitations of ships radars  Head up/North up display  Relative/true motion  Factors affecting interpretation  Introduction to tracking systems and ARPA  ARPA features and use of radar for collision avoidance  Regulations and acts governing performance and carriage of radar | R42, R49, R57 |  |
| Explain the theory and use of gyro and magnetic compasses  Use of magnetic compass on board vessels  Sources of error  Corrections  Reliability  Use of gyro compass on board vessels  Accuracy  Corrections  Reliability |  |  |
| 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 explain the ship terminology - technical  Ship construction terms  Ship dimensions - i.e. LOA, LBP, beam, draught, air draught  Hull structure - i.e. types of bows, sterns  Loadlines draught marks |  |  |
| List and explain the ship terminology - nautical phrases  Directions/relative bearings  Numbers  Mooring/anchoring terms |  |  |
| 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 ship stability  Introduction to ship stability  Definitions of heel, list and trim  Factors influencing ship stability  Recognising dangerous situations regarding ship stability |  |  |
| Explain the theory and practice of ship handling  Effect of pivot point on ship handling  Line of approach  Stopping characteristics  Turning characteristics  External forces on ship handling – winds and tides  Effect of interaction and squat  Vessel manoeuvrability  Different types of rudder  Different types of propeller  Thrusters  Use of tugs |  |  |
| 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  Effects of tides and currents on safety of waterway and ship manoeuvrability  Application of COLREGS with regards to tides and currents  Planning waterway movements taking into account tides and currents |  |  |
| Describe vessel bridge procedures  Maintaining a navigational watch  Under routine circumstances  In pilotage waters  In non-pilotage restricted waters  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  Bridge operations (arrival & departure)  Berthing and unberthing  Anchoring | 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  The organisation of tugs within a port | See also “Ship handling” |  |
| Explain the role of ships agents  General duties of ships agents  The role of ships agents |  |  |

1. COMMUNICATION CO-ORDINATION
   1. INTRODUCTION

Instructors for this module should have knowledge, comprehension and the ability to apply communication techniques as well as qualifications in the VTS/Maritime fields. 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, if practicable, for trainees to visit operational VTS centres.

* 1. SUBJECT FRAMEWORK
     1. Scope

This syllabus covers the requirement for VTS Operators to be able to co-ordinate communications between the VTS centre, participating shipping, allied services and other marine related agencies.

This course covers the theory and practice of co-ordinating communications in a VTS area, including the requirements for and means of providing communications to support an information service, navigational assistance service or traffic organisation service. It also provides an understanding of communication co-ordination requirements in emergency situations.

* + 1. Aims

On completion of the course trainees will possess a thorough knowledge of the basic principles of communication co-ordination and a good knowledge of international and national regulations relating to communication co-ordination requirements for VTS areas in the country concerned.

The trainees will also have a sufficient understanding and practice of the subject to enable them to prioritise, relay and co-ordinate various types of communication between marine and marine related agencies both on board ships and in shore facilities. These communications follow IALA’s list of situations and their associated responses using SMCP in VTS areas.

If a simulator is available it is possible to give the trainees realistic exercises on the role of VTS in co-ordinating communications within a VTS area. Integrated exercises on handling emergency situations could also be carried out.

* 1. SUBJECT OUTLINE OF MODULE 5

1. Subject outline – Communication co-ordination

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| **General communication skills**  Inter personal communication  Procedures to enhance effective communication  Verbal and non-verbal communications  Cultural aspects and common understanding of messages communicated | Level 3 |  | |  | |
| **Communications**  Collection  Evaluation  Dissemination | Level 3 |  | |  | |
| **Log and record keeping**  Objective  Manual log keeping  Electronic log keeping  Statement and report writing | Level 3 |  | |  | |
|  |  | Total 7 hours | | Total 11 hours | |

* 1. DETAILED TEACHING SYLLABUS OF MODULE 5

1. Detailed teaching syllabus – Communication co-ordination

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| General communication skills |  |  |
| *Posses the knowledge of the basic principles of communication and coordination.* |  |  |
| Describe active listening skills  The process of interpersonal communication  Effective team communications  Empathy |  | A6 and A7 for documented case studies |
| State the importance of clear, concise, accurate, timely and meaningful communications  Reading-back received message  Breaking message into smaller components  Rephrasing message |  |  |
| Demonstrate verbal and non-verbal communications  Voice inflection  Non-verbal signals or symbols – internal  Non-verbal signals or symbols – external |  |  |
| Identify words that have multiple interpretations and could negatively impact communications  Language differences, both cultural and regionally  Alternative meanings of words  Cultural aspects in decision making processes – potential impacts  Cultural aspects in understanding of messages – potential impacts |  |  |

| 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 |
| Demonstrate the use of messages and reports  Formal messages to vessels: information/warning/advice/instruction  Phrasing  Timing  Content  Formal messages - waterway information: information/warning/advice/instruction  Phrasing  Timing  Content  Formal messages - allied services: information/warning/advice/instruction  Phrasing  Timing  Content | R19, R58 |  |
| Special reports  Phrasing  Timing  Content  Informal messages  Phrasing  Timing  Content |  |  |
| Log and record keeping |  |  |
| List and describe logs and records used by VTS  Accuracy of logs & records  Factual  Complete  Chronological  Legible  Standardised  Retention of logs & records  Manual: as per national statutory requirements  Electronic: as per national statutory requirements  Legal implications  Statistical process control  Local/national/international database for accident investigation | R28, R37, R41, R44 |  |
| Describe the methods of keeping a log  Manual log keeping  Introduction to manual logs  Purpose  Benefits  Difficulties  Methods of recording  Hand written  Printed copy  Filing  Purpose  Storage  Access  Electronic log keeping  Introduction to electronic logs  Purpose  Benefits  Difficulties  Methods of recording  Voice  Radar/video  Electronic data input devices  Filing  Back-up arrangements  Storing |  |  |
| State the purposes and requirements for statement and report writing  Statutory  Electronic and manual  Legal implications |  |  |

1. VHF RADIO
   1. INTRODUCTION

Instructors for this module should have the knowledge, comprehension and the ability to apply VHF radio communication techniques 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 simulation equipment. In addition, arrangements should be made, if practicable, for trainees to visit operational VTS centres.

* 1. SUBJECT FRAMEWORK
     1. Scope

This syllabus covers the requirement for VTS Operators to be able to transmit voice and data messages using radio sub-systems and equipment for the purpose of fulfilling the functional requirements of VTS centres.

This course covers the theory and practice of using basic VHF radio equipment to transmit and receive calls, messages and information by radiotelephony, the Digital Selective Calling (DSC) system and VHF Automatic Identification System (AIS).

* + 1. Aims

On completion of the course the trainees will have the ability to transmit and receive, efficiently and effectively, voice and data radio communications by all radio sub-systems used in VTS provided by the Competent Authority concerned, in accordance with international regulations and procedures.

They will also know the procedures used in radiotelephone and radio data communications and be able to use radiotelephones and radio data equipment, particularly with respect to VTS, distress, safety and navigational messages.

Trainees will also have the skills to ensure that English language messages (SMCP) relevant to VTS are correctly handled.

If suitable facilities are available it is possible to give the trainees realistic exercises on the transmission and reception of radio traffic within a VTS area. Integrated exercises involving several radio stations could also be carried out.

* 1. SUBJECT OUTLINE OF MODULE 6

1. Subject outline – VHF radio

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| Radio operator practices and procedures  GMDSS Restricted Operator’s Certificate (ROC) or internationally recognised radio certification | Level 4 |  |  |
| VHF radio systems and their use in VTS  Frequencies in the VHF maritime mobile band (ITU RR Appendix S18)  National frequency assignments to VTS | Level 3 |  |  |
| Operation of radio equipment  Introduction to basic VTS VHF radiotelephone, DSC and AIS equipment  Controls and operation of VHF radiotelephone equipment  Controls and operation of VHF DSC equipment  Controls and operation of VHF AIS equipment | Level 4 |  |  |
| Communication procedures, including SAR  VHF radiotelephone procedures  VHF DSC communication procedures  VHF AIS communication procedures  Equipment failure and channel saturation | Level 3 |  |  |
|  |  | Total 15 hours | Total 42 hours |

* 1. DETAILED TEACHING SYLLABUS OF MODULE 6

1. Detailed teaching syllabus – VHF radio

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| Radio operator practices and procedures |  |  |
| *Describe and perform exercises on radio operator practices and procedures* |  |  |
| GMDSS Restricted Operator’s Certificate (ROC)  Internationally recognised radio certification | R10, R33, R28, R29, R30, R31 | A12 or A13,  E1, E5 |
| 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 |  |

| Subjects / Learning Objectives | Reference | Teaching Aid |
| --- | --- | --- |
| 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 |  |
| Communication procedures, including SAR |  |  |
| *Describe and demonstrate the communication procedures, including SAR* |  |  |
| VHF Radiotelephone procedures  Distress, urgency, safety and calling  DSC communication procedures using VHF  Distress, urgency, safety and calling  AIS communication procedures using VHF  Distress, urgency, safety and calling  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 |

1. PERSONAL ATTRIBUTES
   1. 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.

* 1. SUBJECT FRAMEWORK
     1. 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.

* + 1. 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.

* 1. SUBJECT OUTLINE OF MODULE 7

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  Team working skills | Level 2 |  |  |
| Responsibility and reliability  Safety awareness  Health awareness  Punctuality  Attentiveness  Importance of maintaining the trust of all VTS stakeholders | Level 4 |  |  |
|  |  | Total 6 hours | Total 4 hours |

* 1. DETAILED TEACHING SYLLABUS OF MODULE 7

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. |  |  |
| Describe how to establish and sustain working relationships  Internal  External  Importance of maintaining the trust of all VTS stakeholders  Ship masters  Pilots  Other authorities and organisations  Allied services  Other services |  |  |
| Identify methods of conflict resolution  When and how to intervene  Internal  External |  |  |
| Describe the benefits of team working skills  Characteristics of leaders and followers  Adaptability/ flexibility  Diplomacy  Ability to analyse the role of VTS  Decision making process  Taking initiative  Prioritising tasks  Thinking critically  Communicating with team members  Assertiveness |  |  |
| Responsibility and reliability |  |  |
| Explain the role of health and safety performing the VTS mission  Personal safety  Safety of VTS stakeholders  Personal health  Causes of stress  Managing work related stress  Managing personal stress  Substance abuse |  |  |
| 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 |  |  |

1. EMERGENCY SITUATIONS
   1. 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.

* 1. SUBJECT FRAMEWORK
     1. 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.

* + 1. 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.

* 1. SUBJECT OUTLINE OF MODULE 8

1. Subject outline – Emergency situations

|  |  |  |  |
| --- | --- | --- | --- |
| Subject Area | Recommended Competence Level | Recommended Hours | |
| Presentations/ Lectures | Exercises/ Simulation |
| International, national, regional and local regulations  Scope of responsibility and authority to act  Local regulations, bye laws | Level 2 |  |  |
| 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 |

* 1. DETAILED TEACHING SYLLABUS OF MODULE 8

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 |
| --- | --- | --- |
| Record activities concerning emergencies |  |  |
| *Describe objectives and procedures for recording activities during emergency situations, including methods, the information recorded and security of information* |  |  |
| 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 | 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 |

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| 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 on CD-ROM, 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:

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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.*