

Model Course V-103/1

Vessel Traffic Services Operator

Basic Training



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Model Course V-103/1

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Part A - Course Overview

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Section 1 - Introduction

Purpose of the Model Course

The purpose of the model course is to assist maritime training institutes and their teaching staff in organising and introducing new training courses, or in enhancing, updating or supplementing existing training material where the quality and effectiveness of the training courses may thereby be improved.

It is not the intention of the model course to present instructors with a rigid teaching package which they are expected to follow blindly. The knowledge, skills and dedication of instructors are key components in the transfer of knowledge and skills to those being trained through this model course material. For teaching purposes the subjects may be grouped and re-arranged where that is considered an advantage. For example, some elements of Communication Co-ordination and VHF Radio may be integrated. In every case, it is essential that the trainees attain all of the objectives set out in the stated syllabus for the model course.

Recognising that educational systems and the cultural backgrounds of trainees in VTS vary considerably from country to country, the model course material has been designed to identify the basic entry requirements and trainee target group in universally applicable terms. The course material also specifies clearly the technical content and levels of knowledge and skill necessary to achieve the standards of competence defined in IALA Recommendation V-103.

In this regard, the defined standards of competence are considered to be the level of proficiency which should be achieved for the proper performance of functions at a VTS Centre in accordance with the internationally agreed criteria, incorporating prescribed standards or levels of knowledge, understanding and demonstrated skills.

Use of the Model Course

This course is intended to cover the knowledge and practical competence required for certification as a VTS Operator and forms the foundation of studies for VTS personnel. The course is in modular format and is aimed at providing the “basic training” described in IALA Recommendation V-103.

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 is designed to ensure trainees are provided with realistic exercises on the role of VTS. These exercises should, wherever practicable, use simulation. However, where simulation is not practicable, the exercises should be designed to be fully representative of appropriate situations that occur in a VTS.

All training and assessment of personnel for certification as 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, evaluated and supported by persons qualified in accordance with Part A, Training Staff Requirements.

Training personnel should review the course outline and detailed syllabus in each subject. The actual level of knowledge, skills and prior technical education of

the trainees in the subject concerned should be kept in mind during this review. Any differences between the level of skills and competencies of the trainee 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 trainees. The instructor should also identify any academic knowledge, skills or technical training that the trainees 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 may concerned 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 VTS trainees completing the course are to undertake duties which differ from the objectives specified.

Lesson Plans

The modular presentation enables the instructor to adjust the course content to suit the trainee 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 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 basic 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.

VTS Operator Basic Training Model Course – Part A, Course Overview

Learning Outcome	Instructional Objectives	Skill
<p><u>Level 1</u> Work of a routine and predictable nature generally requiring supervision</p>	<p><u>Comprehension.</u> Understands facts and principles; interprets verbal/written material; interprets charts, graphs and illustrations; estimates future consequences implied in data; justifies methods and procedures</p>	<p><u>Guided response.</u> The early stages in learning a complex skill and includes imitation by repeating an action demonstrated by the instructor and using a multi-response approach (trial and error method) to identify an appropriate response.</p>
<p><u>Level 2</u> More demanding range of work involving greater individual responsibility. Some complex/non-routine activities</p>	<p><u>Application.</u> Applies concepts and principles to new situations; applies laws and theories to practical situations; demonstrates correct usage of methods or procedures.</p>	<p><u>Autonomous response.</u> The learned responses have become habitual and the movement is performed with confidence and proficiency.</p>
<p><u>Level 3</u> Skilled work involving a broad range of work activities. Mostly complex and non-routine</p>	<p><u>Complex overt response.</u> 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</p>	<p><u>Analysis.</u> 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.</p>
<p><u>Level 4</u> Work that is often complex, technical and professional with a substantial degree of personal responsibility and autonomy</p>	<p><u>Adaptation.</u> Skills are so well developed that individuals can modify movement patterns to fit special requirements or to meet a problem situation.</p>	<p><u>Synthesis.</u> Integrates learning from different areas into a plan for solving a problem; formulates a new scheme for classifying objects or events.</p>
<p><u>Level 5</u> Complex techniques across wide and often unpredicted variety of contexts. Professional/senior managerial work</p>	<p><u>Origination.</u> The creation of new practices or procedures to fit a particular situation or specific problem and emphasise creativity based upon highly developed skills.</p>	<p><u>Evaluation.</u> 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.</p>

Levels of competence

Presentation

The presentation of concepts and methodologies must be repeated in various ways until the instructor is satisfied that the trainee has attained each specific learning objective. The syllabus in each subject is laid out in learning-objective format and each objective specifies what the trainee must be able to do as the learning outcome.

Evaluation or assessment of trainee progress

The evaluation criteria are given in column 4 of Table 1 of IALA Recommendation V-103, and provide the means for an assessor to judge whether a trainee can perform the related tasks, duties and responsibilities.

Guidance on evaluation or assessment of trainees is given in Section 5 of the course overview.

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 the 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 for use in the training and certification of VTS Operators so that the minimum standards implemented may be as uniform as possible. The technical advisers were drawn from the IALA VTS Committee, training institutions of IALA National Members and experienced VTS Operators. Validation in the context of this document means that the group has found no grounds to object to its contents.

Section 2 - Course Framework

Scope

The course covers the minimum requirements of the IALA Recommendation V-103. It is based on the minimum required knowledge and competence factors for certification as a VTS Operator and covers the theoretical and practical knowledge required for basic training as defined in Recommendation V-103. Satisfactory completion of the course is required for the issue of a VTS Operator Certificate.

Objective

On successful completion of the course and evaluations, and subject to language requirements, the trainees should have sufficient knowledge and competence to proceed to on-the-job training in the VTS Centre in which they are to be employed. In particular they will be fully conversant with the basic principles of vessel traffic services, the services that a VTS can provide to shipping and the resources and means of providing those services.

Entry Standard

The Competent Authority may prescribe minimum educational standards for entry to the profession. In preparing this course it has been assumed that entrants will have successfully completed a minimum period of full-time, general education of about 10 or 11 years and be familiar with the use of computers.

Where entrants have not reached the required standard it will be necessary to provide a preparatory course or acknowledge equivalent training and experience. No previous maritime training is assumed. However, trainees who exceed the minimum entry standard, including those with previous maritime knowledge, should be credited for the appropriate training and the allotted time reduced accordingly.

Requirements for certification

Every candidate for certification should:

- Be not less than 18 years of age;
- Satisfy the Competent Authority by passing an appropriate examination at an Accredited Training Institute that they possess adequate 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 in order to allow the instructor to give adequate attention to individual trainees. In general it is recommended that a maximum of 12-14 students 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 trainees on an individual basis.

During practical sessions and group activities there may be additional restraints on class size. In particular, where the use of a simulator or similar teaching

aid is involved, it is recommended that no more than two students be trained simultaneously on any individual piece of equipment.

Training staff requirements

All instructors, supervisors and assessors should be appropriately qualified for the particular types and levels of training or assessment of competence of VTS Personnel.

Accredited training programmes 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, training and assessment methods and practices, and comply with all applicable recommendations set out in the following paragraphs.

As well as instructors, supervisors 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.

Instructors

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

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

Supervisors

Any person responsible for the supervision of training of personnel should have a full understanding of the training programme and the specific objectives for each type of training being conducted.

Assessors

Any person conducting assessment of competence of personnel which is intended to be used in qualifying for certification as a VTS Operator should:

1. have an appropriate level of knowledge and understanding of the competence to be assessed;
2. be qualified in the task for which the assessment is being made;
3. have received appropriate guidance in assessment methods and practices;
4. have gained practical assessment experience; and,
5. if conducting assessment involving the use of simulators, have gained practical assessment experience on the particular 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 blackboard or whiteboard, an overhead projector or computer-assisted projector and screen are given in the individual subject frameworks.

In order to assist instructors, references are shown against the learning objectives 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. The material listed in the subject frameworks has been used to structure the detailed teaching syllabuses; in particular:

- Teaching aids (indicated by A);
- Equipment needed by trainees (indicated by E)
- References (indicated by R);

will provide valuable information to instructors

Teaching aids

Ideally, the trainees 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 Video films – Bridge Resource Management Series – “Emergency Procedures”
- A15 Manuals, strip cards and other facilities for use with the monitoring systems being taught.
- A16 Interactive video (Videotel) “Understanding English on board ships”

Equipment required for each trainee:

- 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

The references that are relevant to the planning of VTS training are listed below.

- R1 SOLAS' 74 Regulation V/8 - Routeing
- R2 SOLAS '74 Regulation V/8-1 - Ship Reporting Systems
- R3 SOLAS '74 Regulation V/8-2 - Vessel Traffic Services
- R4 SOLAS '74 Regulation V/12 - Shipborne navigation equipment
- R5 SOLAS '74 Regulation V/14 - Aids to navigation
- R6 SOLAS '74 Regulation V/20 - Nautical publications
- R7 International Regulations for Preventing Collisions at Sea, 1972 (COLREGS)
- R8 IMO publication on Ships' Routeing (IMO-927E, IMO-928F, IMO-929S)
- R9 International Maritime Dangerous Goods Code (IMDG Code) - 1994, as amended
- R10 International Convention on Standards of Training, Certification and Watchkeeping of Seafarers, 1978, as amended in 1995 (STCW Convention);
- R11 Seafarer's Training, Certification and Watchkeeping Code (STCW Code);
- R12 Resolution 10 of the 1995 Conference of Parties to the International Convention on standards of Training, Certification and Watchkeeping for Seafarers, 1978;
- R13 IMO Assembly resolution A.851(20), General principles for ship reporting
- R14 IMO Assembly resolution A.857(20), Guidelines on VTS
- R15 IMO Publication "International Aeronautical and Maritime Search and Rescue (IAMSAR) manual" (and/or IMOSAR Manual. ISBN – 9280112953, MERSAR Manual. ISBN – 9280112961)
- R16 IALA Recommendation V-103, Standards of Training and Certification of VTS Personnel.
- R17 IALA Vessel Traffic Services Manual
- R18 IALA Aids to Navigation Guide (NAVGUIDE)
- R19 IMO Standard Marine Navigational Vocabulary (IMO-985E, IMO986F, IMO-988S)
- R20 IMO Standard Marine Communication Phrases (IMO MSC/Circ. 794 (May 30, 1997))
- R21 International Code of Signals (IMO-994E, IMO-995F, IMO-996S)
- R22 IELTS Handbook - British Council, or equivalent.
- R23 Practice Tests for IELTS. Jakeman & McDowell. Cambridge University Press.
ISBN 0521 497 671, 0521 497 663
- R24 United Nations Law of the Sea (UNCLOS)
- R25 Seaspeak Training Manual ISBN 0-08-031555-0
- R26 Marine engineering knowledge (such as: General Engineering Knowledge, by McGeorge, H.D.(Kandy publication), ISBN – 0750600063; Reed's General Engineering Knowledge, by Leslie Jackson(Reed's Series), ISBN – 0947637109)
- R27 Marine Communications Handbook - Lloyds of London
- R28 Marine Communications Handbook - Inmarsat
- R29 ITU Radio Regulations, including Appendices
- R30 English for Maritime Studies, 2nd edition, Blakely, published by Prentice Hall ISBN 0-13-281-379-3

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- R31 Ship to shore: Nautical Terms in everyday English
- R32 Glossary of Marine Technology Terms. Institute of Marine Engineers, ISBN 0434908401
- R33 STCW Code, Section B, Chapter VIII, Part 3-1, Guidance on keeping a navigational watch
- R34 IMO Resolution A.705(17) - Promulgation of Maritime Safety Information (MSI)
- R35 Equipment and system operating manuals
- R36 Radar and Electronic Navigation - G J Sonneberg, ISBN 0-408-00272-7
- R37 Handbook of Data Communications, published by NCC Publications, ISBN 0-85012-363-1
- R38 GMDSS Handbook (IMO-970E and IMO-971E)
- R39 International Maritime Buoyage System, published by IALA
- R40 IHO approved documents of charts and publications
- R41 Fundamentals of Human Communications, Revised Edition, King, R. G., (1991), Macmillan Publishing Company, New York. ISBN 0023642815
- R42 Articulation and Voice: Improving Oral Communication, King, R. G., and DiMichael, E. M., (1978), Macmillan Publishing Company, New York.
- R43 Developing Your Communication Skills, McMaster, R. G., (1978), Longman Canada Limited, Ontario. ISBN 0774711167
- R44 Communication Skills, Pantou, P., (1980), Hutchinson & Co. (Publishers) Ltd, London. ISBN 0091412811
- R45 ITU-R M Recommendation 493
- R46 ITU-R M Recommendation 541
- R47 ITU-R M Recommendation [8C/XA], Technical characteristics for a universal shipborne automatic identification system using time division multiple access in the maritime mobile band.
- R48 United Nations Convention on the Law of the Sea (UNCLOS)
- R49 SOLAS '74 Regulation V/15 - Search and Rescue
- R50 IMO COMSAR/Circ.15 - Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI)
- R51 National procedures and standards for operation of International Convention for the prevention of pollution from ships (MARPOL)
- R52 Local/Regional Contingency requirements
- R53 National, Regional and Local Legislation and Regulations on VTS, Ports, Harbours, Pilotage and Allied Services
- R54 National Notices to Mariners pertaining to VTS
- R55 National procedures and standards for operation of VTS
- R56 How to use the IMO SMCP. Weeks, published by Willerby, London ISBN 8420507679
- R57 PIANC Bulletin No. 16 'Big Tankers and their Reception' (1973)
- R58 PIANC Bulletin No. 35 'Reception of Large Ships' (1985)
- R59 PIANC Bulletin No. 51 'Underkeel Clearance for large ships' (1985)
- R60 PIANC-IAPH Report, Bulletin No. 87 'Approach Channels' (April, 1995)

Section 3 - Course Outline

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 intended to be representative of events and incidents likely to be experienced in a VTS centre.

Subject	Recommended Duration in Hours				Remarks ¹	
	Presentation	Basic (routine)	Advanced	Total		
1 – Language ²	91	---	---	75	<ul style="list-style-type: none"> • Language Structure • Construction of VTS messages 	<ul style="list-style-type: none"> • Standard Marine Communication Phrases • Collating information
2 – Traffic Management	52	24	30	54	<ul style="list-style-type: none"> • Regulatory requirements • Roles and responsibilities • VTS environment 	<ul style="list-style-type: none"> • Principles of waterway and traffic management • Traffic monitoring and organisation
3 - Equipment	39	6	---	6	<ul style="list-style-type: none"> • Telecommunication • Vessel Traffic Management Information systems • Radar, Audio, video and other sensors 	<ul style="list-style-type: none"> • VHF/Direction Finding (VHF/DF) • Tracking Systems • Evolving technologies
4 – Nautical Knowledge	85	29	9	38	<ul style="list-style-type: none"> • Chartwork • Collision Regulations • Aids to Navigation 	<ul style="list-style-type: none"> • Port Operations • Navigational Aids (ship borne) • Shipboard Knowledge
5 – Communication co-ordination	7	11	---	11	<ul style="list-style-type: none"> • General communication skills • Communications 	<ul style="list-style-type: none"> • Log Keeping
6 – VHF Radio	15	17	25	42	<ul style="list-style-type: none"> • Radio Operator Practices and procedures • VHF Radio systems and their use in VTS 	<ul style="list-style-type: none"> • Operation of Radio Equipment • Communication procedures, including SAR
7 – Personal Attributes	6	2	2	4	<ul style="list-style-type: none"> • Diplomacy • Interaction with others • Stress Management 	<ul style="list-style-type: none"> • Management attributes • Reliability
8 – Emergency situation	12	5	5	10	<ul style="list-style-type: none"> • International, National, Regional, Local regulations; Internal/External emergencies • Response to contingency plans • Prioritise and respond to situation • Co-ordination with, and support to, allied services • Record activities concerning emergencies • Maintain a safe waterway throughout emergency 	
Total	309	94	71	240		

- Notes
1. The recommended times are, except for Module 1, based on the assumption that trainees have no previous knowledge of the subject. The actual time required for each module will vary, depending on previous experience and the entrance level of the trainee.
 2. The recommended times for Module 1 are based on the assumption that trainees have achieved, IELTS level 5, or the equivalent.
 3. The times recommended do not include the time necessary for examinations or tests of proficiency.

Section 4 - Guidelines for Instructors

Introduction

VTS Operators are appropriately qualified persons performing one or more tasks contributing to the services of a VTS. 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 minimum requirements for qualification as a VTS Operator capable of, subject to obtaining satisfactory on-the-job training, providing an information, navigation assistance or traffic organisation service.

A sense of responsibility, watchfulness and preciseness characterise a competent VTS Operator. Training and education should therefore aim at stimulating these qualities. This can, *inter alia*, be achieved by impressing upon trainees the importance of proper watchkeeping routines and safe procedures. Trainees should also be motivated to respect instructions, rules and regulations that have been adopted with the intention of protecting life, health, material goods and the environment.

Those parts of the subject that are important from the point of view of safety should be emphasised. The instructor should therefore be thoroughly acquainted with the relevant rules that regulate vessel traffic services.

It is important to keep in mind the close relationship of all subjects in the VTS Operators course. In particular, Instructors should continuously monitor the personal attributes of trainees (see Part 8, Module 7) and, when appropriate, draw their attention to the need to meet the learning objectives of that module.

In vessel traffic services new methods and equipment are developed at a fairly high rate. 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 Table 1 of IALA Recommendation V-103 (VTS Operator Competence chart). The syllabuses are presented this way to show clearly the relationship of the syllabus with the recommendations of the Association.

Although the learning objectives are set out in a teaching order in the syllabuses, instructors are not obliged to teach the objectives in the order in which they appear but should treat them in the order which they consider to be the most effective for their trainees and circumstances.

Great care should be taken when using the specific learning objectives. They have been phrased in a precise form to indicate exactly what the trainee should be

Model Course V-103/1, VTS Operator – Part B, Module 1
Language

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 syllabuses 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 quite usual for different trainees 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 institute. 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 learning objectives are covered, that repetition is avoided and that essential pre-requisite knowledge at any stage has already been covered. Care should be taken to see that items not included in the syllabus or treatments beyond the depth indicated by the objectives have not been introduced except where necessary to meet additional requirements of the Competent Authority.

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 trainees and any problems that have become apparent. Modifications of the teaching scheme should be made where necessary to ensure that trainees are attaining the objectives laid down. If necessary, extra tuition should be arranged to enable weaker students to reach a satisfactory 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 of students, using comments from both trainees and On-the-Job Instructors to help ensure relevancy and validity of future courses. The transition from basic training to On-the-Job training should appear as continuous as possible.

Practical training

In addition to subject modules; the following are recommended simulated exercises

Subject	Assessment criteria	Duration in hours
<p><i>Basic skills.</i></p> <ul style="list-style-type: none"> • 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
<p><i>Traffic interaction and conflict resolution</i></p> <ul style="list-style-type: none"> • Waterway management in multi-ship scenarios, • Anticipation and projection of traffic patterns, • Critical areas • Vessels overtaking and approaching each other • VTS sailing plans, including those for deep draught vessels 	<p>Ability to identify, correctly interpret and deal with up to five simulated vessels in complex situations.</p> <p>Ability to prepare VTS sailing plans, to monitor their execution and amend them due to unforeseen circumstances</p>	60
<p><i>Emergencies and special situations</i></p> <ul style="list-style-type: none"> • 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

Recommended overall exercises

Section 5 - Evaluation or Assessment

To make monitoring possible regular assessment of trainees must be undertaken. In many cases the assessment can be based on the marks given to trainees' 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 learning level attained by trainees. It is recommended that an average level of three to four should be considered as being satisfactory.

Model Course V-103/1, VTS Operator – Part B, Module 1
Language

LEVEL	CATEGORY	DESCRIPTION
LEVEL 1	RECEIVING	The trainee's willingness to participate in the learning activity.
LEVEL 2	RESPONDING	The trainee's active participation in the learning activity.
LEVEL 3	SIGNIFICANCE	The worth that the trainee attaches to a particular object, phenomena or behaviour.
LEVEL 4	ORGANISATION	The trainee's ability in bringing together different values, resolving conflicts between them and beginning the building of an internally consistent value system.
LEVEL 5	VALUE COMPLEX	The value system that has been achieved due to contrary, consistent and predictable behaviour for a sufficiently long time for the trainee to have developed a characteristic 'life style'.

Assessment Levels

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

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

If the Competent Authority requires no examination at the end of a college phase, an evaluation of the trainees should be made to enable trainees and instructors to judge whether the satisfactory level of competence has been reached. To give trainees practice in the relevant examination techniques, the evaluation should be conducted in a manner similar to that required for the issue of a VTS Operators Certificate.

Part B

Module 1 - Language

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Section 1 - Introduction

Instructors for this Module should have qualifications in both English and VTS/Maritime fields. If this cannot be achieved, then an appropriate expert should cover certain sections of this module. Every instructor should have full access to a simulated VTS. In addition, if possible arrangements should be made for trainees to visit operational VTS centres.

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.

In the United States of America the “Teaching of English as a Foreign Language” (TOEFL) test 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 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” .

Section 2 - Subject Framework

Scope

This syllabus covers the requirement for VTS Operators to 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 ships and allied services for VTS purposes, including the operation of contingency plans.

Aims

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.

The trainees will also have a sufficient knowledge of the English language to enable them to understand manufacturers technical manuals on the operation of basic VTS equipment and to operate the equipment properly.

Whilst the ability level indicated by Band 5 acknowledges that a trainee may not possess command of general English and, in this context may “make many mistakes” it is an imperative function of this training module to ensure that, as VTS Operators, personnel possess competence in the use of language specific to VTS Operations. It is emphasized that, by the regular employment of standardized marine vocabulary, VTS Operators will not be liable to mistakes in dealing with routine and emergency communications at their VTS Centre.

Section 3 - Subject Outline

Hours	Subject Area	Recommended		
		Recommended Competence level	Presentation	Exercises/ Simulation
	1. Structure of the English language as applied to voice communications 1.1 Generative English 1.2 English for special purposes, redundancy and precision 1.3 Elimination of ambiguity by choice of words 1.4 Elimination of ambiguity by special techniques. 1.5 Status of a message	Level 3	30 hours total	20 hours total
	2. Specific VTS message construction 2.1 Construction of messages. 2.2 Speech devices to imply higher message status.	Level 4	10 hours total	15 hours total
	3. Standard phrases 3.1 The advantages, disadvantages and application of standard phrases. 3.2 The IMO SMNV in general 3.3 The IMO SMCP in general 3.4 The IMO SMCP, Part 3, Section 6, VTS	Level 2 Level 3	45 hours total	30 hours total
	4. Collecting information 4.2 Questioning techniques.	Level 2	6 hours total	10 hours total

Notes: 1. The time required for Section 1 above will vary with the entrance level of the trainee. See Course Overview, Section 3.

2. All time allocations are set on the assumption that the trainee has achieved level 5, IELTS, or the equivalent.
3. Most aspects of this Module will glean their vocabulary from other Modules.

Section 4 - Detailed Teaching Syllabus

Learning Objectives	Reference	Teaching Aid
<p>1. Structure of the English Language, as applied to voice communications</p>	R30	A16
<p>1.1 Generative English 1.1.1 How English sentences should be put together in practical communications 1.1.2 Examples from ‘Basic English’ and ‘ICAO English’</p>	R 25	
<p>1.2 English for special purposes, redundancy and precision 1.2.1 The exclusion of all items, except those directly applicable to the subject 1.2.2 Legal English, Engineering English and their different structures 1.2.3 When redundancy can aid understanding and when it hampers 1.2.4 The choice of precise words to express meaning</p>	R 24, R 25, R 22, R56	A1 or A8
<p>1.3 Elimination of ambiguity by choice of words 1.3.1 English ‘conditional’ words and their elimination in VTS messages 1.3.2 Consequences of misuse of ‘conditional’ words</p>	R 25, R56	A1
<p>1.4 Elimination of ambiguity by special techniques 1.4.1 The use of ‘Message Markers’ and the meanings they imply</p>	R 20 (VTS Section)	A1 or A8
<p>1.5 Status of a message 1.5.1 Legal implications of using Message markers, particularly “Warning”, “Information”, “Advice” and “Instruction” 1.5.2 Legal and psychological relationship between Master/Pilot and VTS, and the use of message markers 1.5.3 Examples from operational VTS</p>	R 25, R56 R 20 (VTS Section), R25	A1 A1

Model Course V-103/1, VTS Operator – Part C, Module 2
Traffic Management

Learning Objectives	Reference	Teaching Aid
<p>2. Specific VTS message construction</p> <p>2.1 Construction of messages 2.1.1 Methods of maximising clarity of a message and minimising redundancy and ambiguity. 2.1.2 Exercise: Scenarios of clear and ambiguous message construction from practice</p> <p>2.2 Speech devices to imply higher message status 2.2.1 The use of linguistic devices within information messages to imply advice</p>	<p>R 25, R56 R 15, R 25, R56</p>	<p>A1 or A8 A1 A1 A1</p>
<p>3. Standard Phrases</p> <p>3.1 The advantages, disadvantages and application of standard phrases 3.1.1 Use of standard phrases to trigger predictable actions 3.1.2 Limiting the number of standard phrases to ensure recognition and memory retention 3.1.3 When standard phrases are not the best method available</p> <p>3.2 IMO Standard Marine Navigational Vocabulary (SMNV) 3.2.1 Introduction to the SMNV - Its overall construction and origins 3.2.2 The use of the SMNV on ships, particularly during emergency situations and distress 3.2.3 When and how to use the SMNV in response to ships using the system. 3.2.4 Exercise: Usage of SMNV in simulated exercises and in actual recorded events</p>	<p>R 20, R25, R56 R 20 (VTS Section), R56 R 19</p>	<p>A1 A1 or A8</p>

Model Course V-103/1, VTS Operator – Part C, Module 2
Traffic Management

Learning Objectives	Reference	Teaching Aids
<p>3.3 IMO Standard Marine Communication Phrases (SMCP) 3.3.1 Introduction to the SMCP - Its overall construction and origins 3.2.1 The use of the SMCP on ships, particularly during emergency situations and distress 3.3.3 When and how to use the SMCP in response to ships using the system. 3.3.4 Exercise: Usage of SMCP in simulated exercises and in actual recorded events</p>	R 20	
<p>3.4 Part 3, Section 6 of the SMCP - VTS 3.4.1 General layout, Generative section and phrase section 3.4.2 When and how to use the SMCP within a VTS 3.4.3 Exercise: Usage of the SMCP by a VTS in simulated exercises and recorded VTS events</p>	R 20, R56	A1
<p>4. Collecting Information</p> <p>4.1 Questioning Techniques 4.1.1 Direct questioning using Message Markers 4.1.2 Linguistic problems in using voice tone to pose a question 4.1.3 Rejection of abstract questions and double questions 4.1.4 Sarcasm in questioning.</p>	R 20, R 25, R56	A1

Part C

Module 2 - Traffic Management

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Section 1 – Introduction

Instructors for this module should have experience in traffic routing 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

Section 2 - Subject Framework

Scope

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

It also deals with the theory and practice of monitoring and organising traffic, as well as providing knowledge of applicable international and national regulations and ships' safety certificates.

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 could also be carried out.

Section 3 - Subject Outline

Hours	Subject Area	Recommended	
		Recommended competence levels	Presentation Exercises/ Simulation
	1. Regulatory requirements 1.1 International Regulations 1.2 National Regulations including local Bye Laws 1.3 Legal liabilities of VTS functions 1.4 Safety related ship certificates	Level 2 Level 1 Level 1 Level 1	18 hours total
	2. Roles and Responsibilities 2.1 Ship Masters 2.2 Marine Pilots 2.3 VTS 2.4 Allied services	Level 1 Level 1 Level 3 Level 1	6 hours total 3 hours
	3. VTS Environment 3.1 Area limits, boundaries, separation zones, shipping lanes and channels 3.2 Prohibited or dangerous areas, safety zones, anchorages and restricted areas 3.3 Traffic separation schemes 3.4 Traffic separation criteria 3.5 Geographical constraints	Level 4	6 hours total
	4. Principles of waterway and traffic management 4.1 Planning 4.2 Risk management 4.3 Allocation of space 4.4 Criteria which determines the parameters for the safe passage of shipping	Level 4	16 hours total 33 hours
	5. Traffic Monitoring and Organisation 5.1 Traffic patterns 5.2 VTS sailing plans 5.3 Situation analysis	Level 4	6 hours total 18 hours

Section 4 - Detailed Teaching Syllabus

Learning Objectives	Reference	Teaching Aid
<p>1. Regulatory requirements</p> <p>1.1 International Regulations 1.1.1 Sources of literature on International legislative requirements (IMO Resolution 857(20); Ship reporting systems; carriage of Dangerous goods; World VTS Guide; etc.</p> <p>1.2 National Regulations, including local Bye Laws 1.2.1 Sources of National legislation and promulgation 1.2.2 Bye Laws 1.2.3 Notices to Mariners and other nautical publications</p> <p>1.3 Legal liabilities of VTS functions 1.3.1 Extent of competence, authority and responsibility 1.3.1.1 Competent Authority 1.3.1.2 VTS Authority 1.3.1.3 Personnel</p> <p>1.4 Safety related ship certificates</p>	<p>R 1, R 2, R 3, R 7, R 8, R 13, R 14, R 33, R 34, R 53, R 55,</p>	<p>A 2</p>

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Equipment

Learning Objectives	Reference	Teaching Aid
<p>2. Roles and Responsibilities</p> <p>2.1 Ship Masters</p> <p>2.1.1 Organisational structure on board ships</p> <p>2.1.2 Responsibilities of the ships captain and the Officer of the Watch (OOW)</p> <p>2.1.3 Information exchanged between VTS and vessels</p> <p>2.2 Marine Pilots</p> <p>2.2.1 Role of the Pilot on board vessels</p> <p>2.2.2 Information exchange between VTS and Pilots</p> <p>2.3 VTS</p> <p>2.3.1 Organisational structure of VTS</p> <p>2.3.2 Exchange of information between Master/Pilot/VTS</p> <p>2.4 Allied services</p> <p>2.4.1 Roles and responsibilities</p> <p>2.4.2 Exchange of information</p>	<p>R 14, R 16, R 17</p>	<p>E2 during simulation exercises</p>
<p>3. VTS Environment</p> <p>3.1 Area limits, boundaries, separation zones, shipping lanes and channels</p> <p>3.2 Prohibited or dangerous areas, safety zones, anchorages and restricted areas</p> <p>3.3 Traffic separation schemes</p> <p>3.4 Traffic separation criteria</p> <p>3.5 Geographical constraints</p>	<p>R 7, R 8, R 14, R 17, R 18, R 34, R 53</p>	<p>A 1, A5</p>

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Equipment

Learning Objectives	Reference	Teaching Aid
<p>4. Principles of waterway and traffic management</p> <p>4.1 Planning</p> <p>4.1.1 Categories of traffic information</p> <p>4.1.2 Routeing</p> <p style="padding-left: 20px;">4.1.2.1 Channel geography</p> <p style="padding-left: 20px;">4.1.2.2 Traffic restriction areas</p> <p style="padding-left: 20px;">4.1.2.3 Anchorage areas</p> <p style="padding-left: 20px;">4.1.2.4 Obstructions</p> <p>4.1.3 Type of traffic</p> <p style="padding-left: 20px;">4.1.3.1 Ship characteristics</p> <p style="padding-left: 20px;">4.1.3.2 Cargo characteristics</p> <p>4.2 Risk management</p> <p>4.2.1 Controllable risks</p> <p style="padding-left: 20px;">4.2.1.1 Experience of VTS Operators</p> <p style="padding-left: 20px;">4.2.1.2 Utilisation of equipment</p> <p style="padding-left: 20px;">4.2.1.3 Contingency plans/pollution</p> <p>4.2.2 Uncontrollable risks</p> <p style="padding-left: 20px;">4.2.2.1 Geography</p> <p style="padding-left: 20px;">4.2.2.2 Meteorological factors</p> <p style="padding-left: 20px;">4.2.2.3 Hydrographic factors</p> <p style="padding-left: 20px;">4.2.2.4 Traffic congestion</p> <p>4.2.3 Optional practices to mitigate risks</p> <p>4.3 Allocation of space</p> <p>4.3.1 Ships domain</p> <p>4.3.2 Authorising ship movements</p> <p>4.3.3 Allocation of priorities</p>	<p>R 1 to R 18 inclusive, R33, R34 ,R53, R54, R55</p>	<p>A1, A2, A3, A5 E2 during simulated exercises</p>

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Equipment

Learning Objectives	Reference	Teaching Aid
<p>4.4 Criteria which determine the parameters for the safe passage of shipping</p> <p>4.4.1 Water reference level</p> <p style="padding-left: 20px;">4.4.1.1 Tide Guages</p> <p style="padding-left: 20px;">4.4.1.2 Correlation between predicted and actual water levels</p> <p style="padding-left: 20px;">4.4.1.3 Allowance for delayed manoeuvres</p> <p>4.4.2 Safe Underkeel Clearance</p> <p style="padding-left: 20px;">4.4.2.1 Draught measurements Vertical Ship movements, allowance for Squat and Swell</p> <p style="padding-left: 20px;">4.4.2.2 Safety Margins in rock and soft sea-bed conditions</p> <p style="padding-left: 20px;">4.4.2.3 Net underkeel clearance</p> <p>4.4.2.4 Gross underkeel clearance, including allowance for weather; exposure and topography</p> <p>4.4.3 Safe Channel Width</p> <p style="padding-left: 20px;">4.4.3.1 Principles of devising a safe width under calm and adverse conditions</p> <p style="padding-left: 20px;">4.4.3.2 Limiting factors in precise navigation</p> <p style="padding-left: 20px;">4.4.3.3 Adequacy of safe underkeel clearance across channel width</p> <p style="padding-left: 20px;">4.4.3.4 Calculation of safe channel or fairway width</p> <p>4.4.4 Shipping Movements</p> <p style="padding-left: 20px;">4.4.4.1 Movements authorised only when safe criteria have been determined and conditions satisfactorily met</p>	<p>R57, R58, R59, R60</p>	

Model Course V-103/1, VTS Operator - Part D, Module 3
Equipment

Learning Objectives	Reference	Teaching Aid
<p>5. Traffic Monitoring and Organisation</p> <p>5.1 Traffic patterns</p> <p>5.1.1 Manual monitoring of traffic</p> <p> 5.1.1.1 Identification of vessels</p> <p> 5.1.1.2 Non-participating vessels</p> <p>5.1.2 Radar/electronic monitoring of traffic</p> <p> 5.1.2.1 Identification of vessels</p> <p> 5.1.2.2 Non-participating vessels</p> <p> 5.1.2.3 Use of VHF/DF</p> <p> 5.1.2.4 Use of Automatic Identification system (AIS)</p> <p>5.1.3 Traffic clearances</p> <p>5.1.4 Introduction to various traffic patterns</p> <p> 5.1.4.1 Tidal</p> <p> 5.1.4.2 Scheduled</p> <p> 5.1.4.3 Unexpected</p> <p>5.1.5 Recognition of traffic patterns</p> <p> 5.1.5.1 Unsafe</p> <p> 5.1.5.2 Infringements</p> <p> 5.1.5.3 Opposing/crossing/overtaking traffic</p> <p> 5.1.5.4 Areas of congestion</p> <p> 5.1.5.5 Emergencies and contingencies</p>	<p>R 2, R 3, R17, R R34, R 53, R 54, R 55</p>	<p>A1, A3, A5 E1 E2 during simulated exercises</p>
<p>5.2 VTS sailing plans</p> <p>5.2.1 Introduction to VTS sailing plans</p> <p> 5.2.1.1 Purpose - definition</p> <p> 5.2.1.2 Joint agreement with shipmaster.</p> <p>5.2.2 Initiation of sailing plans</p> <p>5.2.3 Monitoring of VTS sailing plans</p> <p> 5.2.3.1 Adjusting VTS sailing plans as required</p> <p> 5.2.3.1 Termination of VTS sailing plans</p>	<p>R 3, R 33 R 53, R 55,</p>	<p>A1, A3, A5</p>

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Equipment

Learning Objectives	Reference	Teaching Aid
<p>5.3 Situation analysis</p> <p>5.3.1 Conflict assessment 5.3.1.1 Spatial separation</p> <p>5.3.2 Determination of relevant traffic 5.3.2.1 Participating/non-participating traffic 5.3.2.2 National and international regulations 5.3.2.3 Local procedures 5.3.2.4 Tools for determining relevant traffic - risk of collision, unclear intentions, non-routine action, blind corner etc.</p>	<p>R2, R 7, R 9, R 13, R 17, R 18, R 33, R 53, R 54</p>	

Model Course V-103/1, VTS Operator - Part D, Module 3
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Part D

Module 3 – Equipment

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Section 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 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 operational VTS centres.

Section 2 - Subject Framework

Scope

This syllabus covers the requirement for VTS Operators to be able to operate efficiently the basic equipment used in VTS centres

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

Aims

On completion of the course trainees will possess a 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.

Section 3 - Subject Outline

Hours	Subject Area	Recommended		
		Recommended competence level	Presentation	Exercises/Simulation
1	Telecommunications 1.1 Fax 1.2 Telephone 1.3 Telex 1.4 E-mail	Level 2	3 hours total	
2.	Vessel Traffic Management Information Systems (VTMIS) 2.1 Introduction to VTMIS 2.2 Co-ordination of information with users/allied services	Level 1	2 hours total	
3.	Radar 3.1 Fundamentals of radar theory 3.2 Radar controls 3.3 Factors affecting radar detection 3.4 Factors affecting interpretation 3.5 Generic VTS radar display features	Level 2	16 hours total	2 hours total
4.	Audio, Video and other sensors 4.1 Television 4.2 Audio equipment 4.3 Video equipment 4.4 Recording/replay equipment 4.5 Meteorological and hydrological sensors	Level 1 Level 3	3 hours total	
5.	VHF/Direction Finding (VHF/DF) 5.1 Purpose and basic principles of VHF/DF 5.2 Accuracies of VHF/DF bearings	Level 1	1 hour total	
6.	Tracking systems 6.1 Introduction to radar tracking systems and ARPA 6.2 Introduction to manual tracking systems 6.3 Introduction to use of Automatic Identification Systems (AIS) for tracking 6.4 Plotting systems 6.5 Information management	Level 3 Level 1 Level 1 Level 3 Level 1	12 hour total	4 hours total
7.	Equipment performance monitoring 7.1 Normal operation expectations 7.2 Troubleshooting	Level 2	1 hour total	
8.	Evolving technologies 8.1 New technologies as appropriate	Understanding	1 hour total	

Model Course V-103/1, VTS Operator – Part E, Module 4
Nautical Knowledge

Section 4 - Detailed Teaching Syllabus

Learning Objectives	Reference	Teaching Aid
<p>1 Telecommunications</p> <p>1.1 Fax</p> <p>1.1.1 Preparation of a facsimile message</p> <p>1.1.2 Transmission of messages</p> <p>1.1.3 Prioritising messages</p> <p>1.2 Telephone</p> <p>1.2.1 Operation of station to station, teleconference and direct line systems</p> <p>1.2.2 Prioritising call</p> <p>1.3 Telex</p> <p>1.3.1 Introduction to telex</p> <p>1.3.2 Set up of telex</p> <p>1.3.3 Transmit/receive telex messages</p> <p>1.3.4 Use of telex in GMDSS</p> <p>1.3.5 Prioritising messages</p> <p>1.4 E-mail</p> <p>1.4.1 Introduction to electronic mail</p> <p>1.4.2 Set up of E-mail</p> <p>1.4.3 Transmit/receive E-mail</p>	<p>R 37</p> <p>R 37</p>	

Model Course V-103/1, VTS Operator – Part E, Module 4
Nautical Knowledge

Learning Objectives	Reference	Teaching Aid
<p>2. Vessel Traffic Management Information Systems (VTMIS)</p> <p>2.1 Introduction to VTMIS 2.1.1 Purpose of VTMIS 2.1.2 users/allied services of VTMIS 2.1.3 Information in VTMIS</p> <p>2.2 Co-ordination of information with users/allied services 2.2.1 input/access to information 2.2.2 priority of information exchange</p>		
<p>3. Radar</p> <p>3.1 Fundamentals of radar theory 3.1.1 Introduction to radar equipment - 3cm and 10cm 3.1.2 Overview of main components 3.1.3 Principles of range and bearing 3.1.4 Relationship between maximum range and pulse recurrence frequency (prf) 3.1.5 Accuracy of radar at different frequency bands 3.1.6 Range and bearing measurements and discrimination</p> <p>3.2 Radar Controls 3.2.1 Performance controls 3.2.2 Set-up controls</p> <p>3.3 Factors affecting radar detection 3.3.1 effect of precipitation (rain, hail, snow) 3.3.2 blind areas 3.3.3 influence of various characteristics of targets on their detection range (aspect, shape, composition, size.)</p>	<p>R 36</p> <p>R 36</p> <p>R 36</p>	

Model Course V-103/1, VTS Operator – Part E, Module 4
Nautical Knowledge

Learning Objectives	Reference	Teaching Aid
<p>4.3 Recording/replay equipment 4.3.1 Audio recording 4.3.2 Video recording</p> <p>4.4 Meteorological and hydrological equipment 4.4.1 Tide gauges - remote height of tide indicators 4.4.2 Tidal stream indicator - remote indications 4.4.3 Barometer 4.4.4 Temperature/humidity indicators 4.4.5 Anemometers</p>	<p>R 35</p> <p>R 35</p>	
<p>5. VHF/Direction Finding (VHF/DF)</p> <p>5.1 Purpose and basic principles 5.2 Accuracies of VHF/DF bearings</p>	<p>R 36</p>	
<p>6. Tracking systems</p> <p>6.1 Introduction to radar tracking and ARPA 6.1.1 Automatic Radar Plotting Aid (ARPA) 6.1.1.1 ARPA theory 6.1.1.2 Vector analysis 6.1.1.3 Limitations and capabilities 6.1.2 Tracking tags 6.1.3 Information available 6.1.4 Limitations/dangers</p>		

Model Course V-103/1, VTS Operator – Part E, Module 4
Nautical Knowledge

Learning Objectives	Reference	Teaching Aid
7. Equipment Performance Monitoring 7.1 Normal operating parameters 7.2 Troubleshooting	R 35	
8. Evolving technologies 8.1 New technologies, as appropriate		

Model Course V-103/1, VTS Operator – Part E, Module 4
Nautical Knowledge

Part E

Module 4 - Nautical Knowledge

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Nautical Knowledge

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Section 1 - Introduction

Instructors for this module should have a good knowledge of ship bridge activities 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, if possible arrangements should be made for trainees to visit operational VTS centres.

Section 2 - Subject Framework

Scope

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

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

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

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, 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.

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

Section 3 - Subject Outline

Subject Area	Recommended		
Hours	Recommended competence level	Presentation	Exercises/ Simulation
1. Chartwork 1.1 Chart information and terminology 1.2 Plotting positions on paper charts 1.3 Speed/distance/time calculations 1.4 True and magnetic courses 1.5 Tides and tidal streams 1.6 Traffic flows 1.7 Paper charts and publications corrections	Level 2	30 hours total	Exercise time included as part of the presentation.
2. Collision Regulations 2.1 International Regulations for preventing Collisions at sea	Level 2 (Level 3 where indicated)	30 hours total	Exercise time included as part of the presentation.
3. Aids to Navigation 3.1 International Maritime Buoyage 3.2 Radar beacons 3.3 Satellite and Differential Satellite position fixing 3.4 Terrestrial position fixing systems	Level 2	15 hours total	
4. Navigational Aids (Shipborne) 4.1 Radar 4.2 Gyro and magnetic compasses 4.2 Other Navigational aids	Level 1	6 hours total	
5. Shipboard Knowledge 5.1 Ship terminology - Technical 5.2 Ship terminology - Nautical phrases 5.3 Types of vessels 5.4 Types of cargo 5.5 Ship stability 5.6 Propulsion systems 5.7 External forces 5.8 Vessel bridge procedures	Level 1	30 hours total	
6. Port Operations 6.1 Pilotage operations and other allied services 6.2 Harbour operations, including contingency plans 6.3 Security 6.4 Tugs and towing 6.5 Ships agents	Level 2	12 hours total	

Model Course V-103/1, VTS Operator – Part F, Module 5
Communication Co-ordination

Section 4 - Detailed Teaching Syllabus

Learning Objectives	Reference	Teaching Aid
<p>1. Chartwork</p> <p>1.1 Chart information and Terminology</p> <p>1.1.1 Introduction to charts and the information contained thereon</p> <p> 1.1.1.1 Finding positions on the globe - lat/long, great circle</p> <p> 1.1.1.2 Chart projections and datums</p> <p>1.1.2 Use of charts in VTS</p> <p>1.1.3 Chart symbols</p> <p> 1.1.3.1 Symbols associated with VTS</p> <p> 1.1.3.2 Importance of symbols in a VTS area</p> <p> 1.1.3.3 Importance of symbols to the mariner</p> <p>1.2 Plotting positions on paper charts</p> <p>1.2.1 Introduction to basic plotting instruments</p> <p> 1.2.1.1 Parallel rulers</p> <p> 1.2.1.2 Compass/dividers</p> <p> 1.2.1.2 Loran-C interpolations, if applicable</p> <p>1.2.2 Introduction to plotting on charts (Using various projections as appropriate)</p> <p> 1.2.2.1 Using parallel rulers</p> <p> 1.2.2.2 Using parallel rulers and compass/dividers</p> <p> 1.2.2.3 Measuring distances on charts</p> <p>1.2.3 Introduction to Lines of Positions (LOPs)</p> <p> 1.2.3.1 Bearings</p> <p> 1.2.3.2 Ranges</p> <p> 1.2.3.3 Loran-C, if applicable</p> <p> 1.2.3.4 Combination of LOPs</p> <p> 1.2.3.5 Definition of “cocked hat”</p> <p> 1.2.3.6 LOPs given from ships and calculated from shore positions</p>	R 40	A1, A2, A3, A6, A7

Model Course V-103/1, VTS Operator – Part F, Module 5
Communication Co-ordination

Learning Objectives	Reference	Teaching Aid
<p>1.3 Speed/distance/time calculations</p> <p>1.3.1 Introduction of S, D, T formula ($S \times T = D$)</p> <p> 1.3.1.1 Use of formula in simple situations</p> <p> 1.3.1.2 Use of formula in complex situations</p> <p>1.4 True and Magnetic courses</p> <p>1.4.1 Introduction to laying of a true course</p> <p> 1.4.1.1 Using parallel rules to compass rose</p> <p> 1.4.1.2 Using parallel rulers to line of longitude on mercator charts</p> <p> 1.4.1.3 Reading courses off charts</p> <p>1.4.2 Introduction to Dead Reckoning (DR) positions</p> <p> 1.4.2.1 Accepted symbology used on charts</p> <p> 1.4.2.2 Calculating and measuring for DR positions</p> <p>1.4.3 Introduction to Compass and Magnetic courses</p> <p> 1.4.3.1 Definition of variation, deviation and compass error</p> <p> 1.4.3.2 Problems associated with using magnetic compass or true courses from shore-based position</p> <p>1.5 Tides and tidal streams</p> <p>1.5.1 Introduction to tides and tidal stream</p> <p>1.5.2 Definition of terms relating to tides and tidal streams</p> <p> 1.5.2.1 Chart datum</p> <p> 1.5.2.2 Height of tide</p> <p> 1.5.2.3 Spring/neap tides</p> <p> 1.5.2.4 Ebb/flow/slack/eddies</p> <p> 1.5.2.5 Freshet</p> <p> 1.5.2.6 set/drift/rate</p> <p> 1.5.2.7 diurnal/semi-diurnal</p>		

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Communication Co-ordination

Learning Objectives	Reference	Teaching Aid
<p>1.5.3 Introduction to Tide and Current Tables</p> <ul style="list-style-type: none"> 1.5.3.1 Information contained in tide tables 1.5.3.2 reading tide tables 1.5.3.3 reading current tables 1.5.3.4 Overview of calculating intermediate heights and times 1.5.3.5 Overview of primary and secondary ports <p>1.5.4 Introduction to use of DR, taking into account tides and currents/estimated positions (EP)</p> <ul style="list-style-type: none"> 1.5.4.1 Review of DR 1.5.4.2 Explanation of EP 1.5.4.3 Effect of tides and currents 1.5.4.4 Effect of wind/leeway <p>1.6 Traffic flows</p> <ul style="list-style-type: none"> 1.6.1 Using chartwork to project traffic flows. <ul style="list-style-type: none"> 1.6.1.1 Use of DR and EP 1.6.1.2 Ascertaining waterway information using charts and symbols 1.6.1.3 Formulating plans of action using information provided, chart information, tidal information, etc. <p>1.7 Paper charts and publications corrections</p> <ul style="list-style-type: none"> 1.7.1 Introduction to Notices to Mariners <ul style="list-style-type: none"> 1.7.1.1 Introduction to written Notices to Mariners 1.7.1.2 Introduction to broadcast notices to shipping, including fishing vessels 1.7.2 Methods of correcting publications <ul style="list-style-type: none"> 1.7.2.1 Procedures for corrections 1.7.2.2 Recording corrections 		

Model Course V-103/1, VTS Operator – Part F, Module 5
Communication Co-ordination

Learning Objectives	Reference	Teaching Aid
1.7.3 Methods of correcting paper charts 1.7.3.1 Procedures for corrections 1.7.3.2 Recording corrections 1.7.3.3 Temporary and Preliminary corrections		
<p>2. Collision Regulations</p> <p>2.1 International Regulations for Preventing Collisions at Sea</p> 2.1.1 Definitions of specific terms in the Collision Regulations <p>2.1.2 Application of the Collision Regulations</p> 2.1.2.1 Application for ships 2.1.2.2 Application as pertains to VTS 2.1.2.3 Enforcement of regulations <p>2.1.3 Basic steering and sailing rules</p> 2.1.3.1 International regulations 2.1.3.2 National specifications and variances <p>2.1.4 Conduct of vessels in specific conditions (Level 2)</p> 2.1.4.1 Conduct in narrow channels 2.1.4.2 Conduct in Traffic Separation Schemes <p>2.1.5 International Distress Signals (Level 2)</p> 2.1.5.1 Annex IV to the Collision Regulations <p>2.1.6 Basic lights, shapes and sounds as described in the Regulations</p> <p>2.1.7 Description of the contents of Annexes I and III, and parts E and F</p>	R 7	A1, A2 Case studies

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Learning Objectives	Reference	Teaching Aid
<p>3. Aids to Navigation</p> <p>3.1 International Maritime Buoyage</p> <p>3.1.1 Introduction to the International Maritime Buoyage System</p> <p> 3.1.1.1 Lateral systems (A & B)</p> <p> 3.1.1.2 Cardinal system</p> <p> 3.1.1.3 Implications of various systems</p> <p> 3.1.1.4 Regulations pertaining to buoyage systems</p> <p>3.1.2 Characteristics of floating aids</p> <p> 3.1.2.1 Types of buoys</p> <p> 3.1.2.2 Placement of buoys</p> <p> 3.1.2.3 Fundamental rules for safe navigation</p> <p> 3.1.2.4 Chart symbols and abbreviations for floating aids</p> <p> 3.1.2.5 Numbering of aids</p> <p> 3.1.2.6 Topmarks</p> <p>3.1.3 Characteristics of fixed aids</p> <p> 3.1.3.1 Day beacons</p> <p> 3.1.3.2 Light stations</p> <p> 3.1.3.3 Ranges</p> <p> 3.1.3.4 Sector lights</p> <p> 3.1.3.5 Fog signals</p> <p>3.2 Radar beacons</p> <p>3.2.1 Introduction to radar beacons (RACONS)</p> <p> 3.2.1.1 Purpose</p> <p> 3.2.1.2 Special characteristics</p> <p> 3.2.1.3 Recognition and identification</p> <p>3.2.2 Implications of radar beacons (RACONS)</p> <p> 3.2.2.1 Limitations</p> <p> 3.2.2.2 Users</p>	<p>R 39</p> <p>R 18</p> <p>R 18</p> <p>R 18, R 36</p>	<p>A1, A2</p>

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Learning Objectives	Reference	Teaching Aid
<p>4.2.2 Use of gyro compass on board vessels</p> <p style="margin-left: 20px;">4.2.2.1 Accuracy</p> <p style="margin-left: 20px;">4.2.2.2 Corrections</p> <p style="margin-left: 20px;">4.2.2.3 Reliability</p> <p>4.3 Other Navigational Aids</p> <p>4.3.1 Introduction to Echo Sounders</p> <p>4.3.2 Introduction to Speed Logs</p> <p style="margin-left: 20px;">4.3.2.1 Principles of Speed Logs</p> <p style="margin-left: 20px;">4.3.2.2 Accuracy of Speed Logs</p> <p>4.3.3 Introduction to ECDIS and ECS</p> <p style="margin-left: 20px;">4.3.3.1 Means of displaying information</p> <p style="margin-left: 20px;">4.3.3.2 Symbology</p> <p style="margin-left: 20px;">4.3.3.3 Uses and limitations</p> <p style="margin-left: 20px;">4.3.3.4 Chart deatums</p>		
<p>5. Shipboard knowledge</p> <p>5.1 Ship Terminology - Technical</p> <p>5.1.1 Ship construction terms</p> <p>5.1.2 Ship dimensions - i.e. LOA, LBP, beam, draught, air draught</p> <p>5.1.3 Hull structure - i.e. types of bows, sterns</p> <p>5.1.4 Loadlines draught marks</p>	R 31	

Model Course V-103/1, VTS Operator – Part F, Module 5
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Learning Objectives	Reference	Teaching Aid
<p>5.2 Ship Terminology - Nautical Phrases</p> <ul style="list-style-type: none"> 5.2.1 Directions/relative bearings 5.2.2 Numbers 5.2.3 Mooring/anchoring terms <p>5.3 Types of vessels</p> <ul style="list-style-type: none"> 5.3.1 General cargo ships 5.3.2 Tankers 5.3.3 Bulk carriers 5.3.4 Combination carriers 5.3.5 Container ships 5.3.6 Passenger ships 5.3.7 Ro-ro ships 5.3.8 Fishing vessels 5.3.9 Offshore vessels 5.3.10 Rigs 5.3.11 Offshore supply 5.3.12 Offshore tugs 5.3.13 Tugs 5.3.14 Pilot boats 5.3.15 SAR 5.3.16 Ships operated by Allied Services <p>5.4 Types of Cargo</p> <ul style="list-style-type: none"> 5.4.1 General cargo 5.4.2 Refrigerated 5.4.3 Liquid 5.4.4 Bulk 5.4.5 Containers 5.4.6 Ro-ro 5.4.7 Fish 5.4.8 Hazardous 		

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Communication Co-ordination

Learning Objectives	Reference	Teaching Aid
<p>5.5 Ship stability</p> <ul style="list-style-type: none"> 5.5.1 Introduction to ship stability <ul style="list-style-type: none"> 5.5.1.1 Definitions of Heel, List and Trim 5.5.1.2 Factors influencing ship stability 5.5.1.3 Recognising dangerous situations regarding ship stability <p>5.6 Ship handling</p> <ul style="list-style-type: none"> 5.6.1 Effect of pivot point on ship handling 5.6.2 Line of approach 5.6.3 Stopping characteristics 5.6.4 Turning characteristics 5.6.5 External forcings on ship handling – winds and tides 5.6.6 Effect of interaction and squat 5.6.7 Vessel manoeuvrability 5.6.8 Different types of rudder 5.6.9 Different types of propeller 5.6.10 Thrusters 5.6.11 Use of tugs <p>5.7 Propulsion systems</p> <ul style="list-style-type: none"> 5.7.1 Introduction to propulsion systems <ul style="list-style-type: none"> 5.7.1.1 Diesel, Diesel Electric 5.7.1.2 Gas turbine 5.7.1.3 Steam 5.7.1.4 Jet 	<p>R57, R58, R59, R60</p>	

Model Course V-103/1, VTS Operator – Part F, Module 5
Communication Co-ordination

Learning Objectives	Reference	Teaching Aid
<p>5.8 External forces</p> <p>5.8.1 Meteorological elements</p> <p style="padding-left: 20px;">5.8.1.1 Effects of wind on safety of waterway and ship manoeuvrability</p> <p style="padding-left: 20px;">5.8.1.2 Effects of reduced visibility on safety of waterway</p> <p style="padding-left: 20px;">5.8.1.3 Effects of high and low pressure systems on water height and depth</p> <p>5.8.2 Oceanographic factors</p> <p style="padding-left: 20px;">5.8.2.1 Effects of tides and currents on safety of waterway and ship manoeuvrability</p> <p style="padding-left: 20px;">5.8.2.2 Application of COLREGS with regards to tides and currents</p> <p style="padding-left: 20px;">5.8.2.3 Planning waterway movements taking into account tides and currents</p> <p>5.9 Vessel Bridge procedures</p> <p>5.9.1 Maintaining a navigational watch</p> <p style="padding-left: 20px;">5.9.1.1 Under routine circumstances</p> <p style="padding-left: 20px;">5.9.1.2 In Pilotage waters</p> <p style="padding-left: 20px;">5.9.1.3 In non-pilotage waters</p> <p>5.9.2 Response to emergencies which arise in a VTS area</p> <p style="padding-left: 20px;">5.9.2.1 Regulations governing transit of vessels with regard to special circumstances</p> <p style="padding-left: 20px;">5.9.2.2 Expected actions on board vessels during special circumstances</p> <p>5.9.3 Bridge operations during various operations</p> <p style="padding-left: 20px;">5.9.3.1 Berthing and unberthing</p> <p style="padding-left: 20px;">5.9.3.2 Anchoring</p>	<p>R 33</p> <p>R 15, R 33, R 53, R 55</p>	

Model Course V-103/1, VTS Operator – Part F, Module 5
Communication Co-ordination

Learning Objectives	Reference	Teaching Aid
<p>6. Port Operations</p> <p>6.1 Pilotage operations and allied services</p> <p>6.1.1 Introduction to Pilotage operations</p> <p>6.1.1.1 Pilotage waters</p> <p>6.1.1.2 Responsibilities of Pilots</p> <p>6.1.1.3 Master/Pilot/VTS relationship</p> <p>6.2 Harbour operations</p> <p>6.2.1 Overview of harbour operations</p> <p>6.2.1.1 Interaction of all agencies within a port</p> <p>6.2.1.2 Responsibilities of harbour masters and berthing masters</p> <p>6.2.1.3 Clearance procedures</p> <p>6.2.1.4 Intermodal transport</p> <p>6.2.2 Regulations and Acts in effect within harbour limits</p> <p>6.2.3 Contingency plans</p> <p>6.2.3.1 Pollution</p> <p>6.2.3.2 SAR</p> <p>6.2.3.3 Grounding</p> <p>6.2.3.4 Salvage</p> <p>6.3 Security</p> <p>6.3.1 Overview of harbour operations</p> <p>6.3.1.1 Port policing</p> <p>6.3.1.2 Interaction with municipal, national, international security</p> <p>6.3.2 General overview of security of VTS centres and outstations</p>	<p>R53, R54, R55</p>	

Model Course V-103/1, VTS Operator – Part F, Module 5
Communication Co-ordination

Learning Objectives	Reference	Teaching Aid
<p>6.4 Tugs and towing</p> <ul style="list-style-type: none">6.4.1 Introduction to types of tug 6.4.2 Overview of towing operations<ul style="list-style-type: none">6.4.2.1 Means of towing6.4.2.2 Terms relating to towing6.4.2.3 Special considerations given to tugs and tows <p>6.5 Ships agents</p> <ul style="list-style-type: none">6.5.1 the role of ships agents<ul style="list-style-type: none">6.5.1.1 General duties of ships agents6.5.1.2 The role of ships agents	<p>See, § 5.6.11</p>	

Model Course V-103/1, VTS Operator – Part F, Module 5
Communication Co-ordination

Part F

Module 5 - Communication Co-ordination

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Section 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, if possible arrangements should be made for trainees to visit operational VTS centres.

Section 2 - Subject Framework

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, navigation assistance or traffic management service. It also provides an understanding of communication co-ordination requirements in emergency situations.

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.

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.

Section 3 - Subject Outline

Hours	Subject Area	Recommended		
		Recommended competence level	Presentation	Exercises/ Simulation
	1. General communication skills 1.1 Inter personal communication 1.2 Procedures to enhance effective communication 1.3 Verbal and non-verbal communications 1.4 Cultural aspects and common understanding of messages communicated	Level 3	3 hours total	4 hours total
	2. Communications 2.1 Collection 2.2 Evaluation 2.3 Dissemination	Level 3	2 hours total	6 hour total
	3. Log and Record Keeping 3.1 Objective 3.2 Manual log keeping 3.3 Electronic log keeping 3.4 Statement and report writing	Level 3	2 hours total	1 hour total

Model Course V-103/1, VTS Operator – Part G - Module 6
VHF Radio

Section 4 - Detailed Teaching Syllabus

Learning Objectives	Reference	Teaching Aid
<p>1. General communication skills</p> <p>1.1 Inter personal communication</p> <p>1.1.1 The process of interpersonal communication</p> <p>1.1.2 Active listening skills</p> <p>1.1.3 Effective team communications</p> <p>1.1.4 Empathy</p> <p>1.2 Procedures to enhance effective communication</p> <p>1.2.1 Importance of clear, concise, accurate, timely and meaningful communication</p> <p>1.2.2 Reading-back received message</p> <p>1.2.3 Breaking message into smaller components</p> <p>1.2.4 Rephrasing message</p> <p>1.3 Verbal and non-verbal communications</p> <p>1.3.1 Voice inflection</p> <p>1.3.2 Non-verbal signals or symbols – internal</p> <p>1.3.3 Non-verbal signals or symbols – external</p> <p>1.4 Cultural aspects and common understanding of messages communicated</p> <p>1.4.1 Cultural aspects in decision making processes – potential impacts</p> <p>1.4.2 Cultural aspects in understanding of messages – potential impacts</p> <p>1.4.3</p>	<p>R44</p> <p>R41, pp 361</p> <p>R41, pp 152 - 157</p> <p>R41 pp, 255 – 272, R42</p>	<p>A6 and A7 for documented case studies</p>
<p>2. Communications</p> <p>2.1 Collection of data</p> <p>2.1.1 Formal messages - Ship reporting</p> <p>2.1.1.1 Marine Reporting</p> <p>2.1.1.2 National regulations</p> <p>2.1.1.3 Local regulations</p>	<p>R13, R17, R29,R53, R55</p>	<p>A6 and A7 for documented case studies.</p>

Model Course V-103/1, VTS Operator – Part G - Module 6
VHF Radio

Learning Objectives	Reference	Teaching Aid
<p>2.2 Evaluation</p> <p>2.2.1 Prioritising</p> <p> 2.2.1.1 Routine</p> <p> 2.2.1.2 Non-Routine</p> <p> 2.2.1.3 Emergencies – Incidents / Accidents</p> <p>2.2.2 Formulate Plan of Action for Communications</p> <p> 2.2.2.1 Identify objectives</p> <p> 2.2.2.2 Define resources</p> <p> 2.2.2.3 Formulate plan in accordance with contingency plan</p> <p> 2.2.2.4 Execute plan</p> <p> 2.2.2.5 Evaluate progress</p> <p> 2.2.2.6 Consider “worst case” / “what if” scenario</p> <p> 2.2.2.7 Modify plan or objectives as necessary</p> <p>2.3 Dissemination</p> <p>2.3.1 Formal Messages to vessels: warning/information/advice/instructions</p> <p> 2.3.3.1 Phrasing</p> <p> 2.3.3.2 Timing</p> <p> 2.3.3.3 Content</p> <p>2.3.2 Formal messages - Waterway Information: warning/information/advice/instructions</p> <p> 2.3.2.1 Phrasing</p> <p> 2.3.2.2 Timing</p> <p> 2.3.3.3 Content</p> <p>2.3.3 Formal Messages - Allied Services: warning/information/advice/instructions</p> <p> 2.3.3.1 Phrasing</p> <p> 2.3.3.2 Timing</p> <p> 2.3.3.3 Content</p>	<p>R17, R29, R55</p>	<p>A6 and A7 for documented case studies and scenarios of maritime disasters</p> <p>Exercises</p>

Model Course V-103/1, VTS Operator – Part G - Module 6
VHF Radio

Learning Objectives	Reference	Teaching Aid
2.3.4 Special Reports <ul style="list-style-type: none"> 2.3.4.1 Phrasing 2.3.4.2 Timing 2.3.4.3 Content 2.3.5 Informal messages <ul style="list-style-type: none"> 2.3.5.1 Phrasing 2.3.5.2 Timing 2.3.5.3 Content 		
3. Log and Record Keeping 3.1 Objective <ul style="list-style-type: none"> 3.1.1 Accuracy of Logs & Records <ul style="list-style-type: none"> 3.1.1.1 Factual 3.1.1.2 Complete 3.1.1.3 Chronological 3.1.1.4 Legible 3.1.1.5 Standardised 3.1.2 Retention of Logs & Records <ul style="list-style-type: none"> 3.1.2.1 Manual: as per national statutory requirements 3.1.2.2 Electronic: as per national statutory requirements 3.1.3 Statistical <ul style="list-style-type: none"> 3.1.3.1 Statistical Process Control 3.1.3.2 Local/National/International database for accident investigation 	R17, R29, R55	

Model Course V-103/1, VTS Operator – Part G - Module 6
VHF Radio

Learning Objectives	Reference	Teaching Aid
<p>3.2 Manual Log keeping</p> <ul style="list-style-type: none"> 3.2.1 Introduction to Manual Logs <ul style="list-style-type: none"> 3.2.1.1 Purpose 3.2.1.2 Local/National statutory requirements 3.2.1.3 Legal implications 3.2.2 Methods of recording <ul style="list-style-type: none"> 3.2.2.1 Hand written 3.2.2.2 Manual typewritten 3.2.3 Methods of retention <ul style="list-style-type: none"> 3.2.3.1 Local/National statutory requirements 3.2.4 Security <ul style="list-style-type: none"> 3.2.4.1 Purpose 3.2.4.2 Storage 3.2.4.3 Access <p>3.3 Electronic Log keeping</p> <ul style="list-style-type: none"> 3.3.1 Introduction to electronic logs <ul style="list-style-type: none"> 3.3.1.1 Purpose 3.3.1.2 Benefits 3.3.1.3 Difficulties 3.3.2 Methods by which information is recorded in electronic logs <ul style="list-style-type: none"> 3.3.2.1 Voice 3.3.2.2 Radar/video 3.3.2.3 Electronic data input devices 3.3.3 Security of electronic logs <ul style="list-style-type: none"> 3.3.3.1 Back-up arrangements 3.3.3.2 Storing 		

Model Course V-103/1, VTS Operator – Part G - Module 6
VHF Radio

Learning Objectives	Reference	Teaching Aid
3.4 Statement and Report Writing 3.4.1 Purpose 3.4.2 Statutory requirements 3.4.3 Legal implications		

Module 6 - VHF Radio

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Section 1 - Introduction

Instructors for this module should have the knowledge, comprehension and the ability to apply VHF radiocommunication 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 simulated VTS. In addition, if possible arrangements should be made for trainees to visit operational VTS centres.

Section 2 - Subject Framework

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 and the GMDSS.

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).

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 use 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 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.

Section 3 - Subject Outline

Hours	Subject Area	Recommended	
		Recommended competence level	Presentation Exercises/ Simulation
	1. Radio Operator practices and procedures 1.1 Radio operator's restricted GMDSS Certificate	Level 4	5 hours total 25 hours total
	2. VHF Radio systems and their use in VTS 2.1 Frequencies in the VHF Maritime Mobile band (ITU RR Appendix S18) 2.2 National frequency assignments to VTS	Level 3	2 hours total
	3. Operation of radio equipment 3.1 Introduction to basic VTS VHF radiotelephone, DSC and AIS equipment 3.2 Controls and operation of VHF radiotelephone equipment 3.3 Controls and operation of VHF DSC equipment 3.4 Controls and operation of VHF AIS equipment	Level 4	2 hours total 11 hours total
	4. Communication procedures, including SAR 4.1 VHF Radiotelephone procedures 4.2 VHF DSC communication procedures 4.3 VHF AIS communication procedures 4.4 Equipment failure and channel saturation	Level 3	6 hours total 6 hours total

Model Course V-103/1, VTS Operator – Part H, Module 7
Personal Attributes

Section 4 - Detailed Teaching Syllabus

Learning Objectives	Reference	Teaching Aids
<p>1. Radio Operator practices and procedures</p> <p>1.1 Radio Operator's restricted GMDSS Certificate</p>	R11, R27, R28, R29,	A12 or A13, E1, E5
<p>2. VHF Radio systems and their use in VTS</p> <p>2.1 Frequencies in the International VHF Maritime Mobile band</p> <p>2.1.1 Single frequency and two frequency channels</p> <p style="padding-left: 20px;">2.1.1.1 Simplex working</p> <p style="padding-left: 20px;">2.1.1.2 Duplex working</p> <p>2.1.2 Port operation and ship movement frequencies</p> <p>2.1.3 Distress, safety and calling frequencies</p> <p style="padding-left: 20px;">2.1.3.1 Radiotelephone</p> <p style="padding-left: 20px;">2.1.3.2 DSC</p> <p>2.1.4 Automatic Identification Systems (AIS)</p> <p style="padding-left: 20px;">2.1.4.1 Introduction to AIS</p> <p style="padding-left: 20px;">2.1.4.2 Application of AIS to VTS</p> <p>2.1.5 Restrictions on the use of Radio Regulations Appendix S18 frequencies</p> <p>2.2 National frequencies assigned to VTS</p> <p>2.2.1 Assignment and use of single and two frequency channels for VTS purposes</p> <p>2.2.2 National restrictions on the use of RR Appendix S18 frequencies</p>	<p>R11, Appendix S18</p> <p>R11, Appendix S18</p> <p>R11, Appendix S18</p> <p>R11, Appendix S18</p> <p>R11, Appendix S18</p> <p>R55</p>	

Model Course V-103/1, VTS Operator – Part H, Module 7
Personal Attributes

Part H

Module 7 - Personal Attributes

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Note. * The term “VTS Stakeholders” used in this Module includes:

- Participating ships;
- Other users of the service or of the information available from the VTS;
- Vessels, organisations and authorities which provide the VTS with information;
and,
- VTS personnel.

Section 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.

Section 2 - Subject Framework

Scope

This syllabus covers the requirement for VTS Operators to be able to perform their duties properly under all conditions including emergency situations stressful circumstances, such as high density of marine traffic, co-ordinating and inter-acting with other services and authorities and working within a team. It is emphasised that the contents of this module will be imparted to the trainees in the early stages of the course to enable the desired values to be imbibed and consolidated during the entire duration of their training period.

Aims

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

The trainees will also have a sufficient sense of responsibility, independence and a willingness to co-operate with others as part of a VTS team.

Section 3 - Subject Outline

Subject Area	Hours		
	Recommended competence level	Presentation	Exercises/ Simulation
1. Personal interaction and human relation skills 1.1 Public relations 1.2 Establishing and sustaining a good working relationship with VTS stakeholders 1.3 Negotiations with VTS stakeholders 1.4 Successful conflict resolution 1.5 Team working skills	Level 2	3 hour total	2 hour total
2. Responsibility 2.1 Safety awareness 2.2 Health awareness 2.3 Punctuality 2.4 Attentiveness 2.5 Importance of maintaining the trust of all VTS stakeholders	Level 4	3 hour total	2 hour total

Model Course V-103/1, VTS Operator – Part I, Module 8
Emergency Situations

Section 4 - Detailed Teaching Syllabus

Learning Objectives	Reference	Teaching Aids
<p>1. Personal Interaction & Human Relations</p> <p>1.1 Public relations</p> <p>1.1.1 General introduction to the maintenance of good public relations.</p> <p>1.1.2 The media and press and their requirements.</p> <p>1.1.3 Information that can be provided to others and the manner of its release.</p> <p>1.1.4 Dealing with traumatised individuals.</p> <p>1.2 Establishing and sustaining a good working relationship with VTS stakeholders</p> <p>1.2.1 Internal</p> <p>1.2.2 External</p> <p>1.2.2.1 Ships' Masters</p> <p>1.2.2.2 Marine Pilots</p> <p>1.2.2.3 Other authorities and organisations</p> <p>1.2.2.4 Allied services</p> <p>1.2.2.5 Other services</p> <p>1.3 Negotiating with VTS stakeholders</p> <p>1.3.1 Internal</p> <p>1.3.2 External</p> <p>1.3.2.1 Port and harbour authorities</p> <p>1.3.2.2 Allied services</p> <p>1.3.2.3 Other services</p> <p>1.3.2.4 Other authorities and organisations</p> <p>1.4 Successful conflict resolution</p> <p>1.4.1 When and how to intervene</p>		

Model Course V-103/1, VTS Operator – Part I, Module 8
Emergency Situations

Learning Objectives	Reference	Teaching Aids
<p>1.5 Team working skills</p> <ul style="list-style-type: none"> 1.5.1 Leader/follower 1.5.2 Adaptability/ flexibility 1.5.3 Ability to analyse the role of VTS: mission analysis 1.5.4 Decision making process <ul style="list-style-type: none"> 1.5.4.1 Taking initiative 1.5.4.2 Prioritising tasks 1.5.4.3 Thinking critically 1.5.5 Communicating with team members 1.5.6 Assertiveness 		
<p>2. Responsibility</p> <p>2.1 Safety awareness</p> <ul style="list-style-type: none"> 2.1.1 Personal safety 2.1.2 Safety of VTS stakeholders 2.2.1 Personal health <ul style="list-style-type: none"> 2.2.1.1 Causes of stress 2.2.1.2 Managing work related stress 2.2.1.3 Managing personal stress 2.2.1.4 Substance abuse <p>2.2 Health awareness</p> <p>2.3 Punctuality</p> <ul style="list-style-type: none"> 2.3.1 Time management 2.3.2 Repercussions of not being punctual <p>2.4 Attentiveness</p> <p>2.5 Importance of maintaining the trust of all VTS stakeholders</p>		

Model Course V-103/1, VTS Operator – Part I, Module 8
Emergency Situations

Part I

Module 8 - Emergency Situations

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Section 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, if possible arrangements should be made for trainees to visit operational VTS centres.

Section 2 - Subject Framework

Scope

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

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

Aims

On completion of the course trainees will have knowledge of related national and international regulations concerning distress, pollution prevention and other special circumstances. They will 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 will also have sufficient understanding and practice to be able to co-ordinate effectively with allied services, particularly search and rescue authorities

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

Section 3 - Subject Outline

Subject Area Hours	Recommended		
	Recommended competence level	Presentation	Exercises/ Simulation
1. National and international regulations 1.1 Scope of responsibility and authority to act 1.2 Local regulations, Bye Laws	Level 2	2 hours total	---
2. Response to contingency plans 2.1 Introduction, preparation and implementation of contingency planning 2.2 Preparation and use of checklists	Level 2	2 hours total	1 hour total
3 Prioritise and respond to situations 3.1 Ascertain nature of incident 3.2 Commence alerting procedures 3.3 Navigational warnings	Level 2	2 hours total	3 hour total
4.1 Co-ordination with, and support to, allied services: 4.1 Maintaining communications 4.2 Updating of situation reports	Level 2	1 hour total	3 hour total
5. Record activities concerning emergencies 5.1 Objective of recording activities during emergency situations 5.2 Introduction to methods of recording activities during emergency situations 5.3 Information which should be recorded 5.4 security of recorded information	Level 2	1 hour total	1 hour total
6. Maintain a safe waterway throughout emergency situations 6.1 Maintaining traffic management and monitoring procedures	Level 2	2 hours total	1 hour total
7. Internal/external Emergencies 7.1 Procedures for individual emergencies 7.2 Maintenance of VTS operations	Level 2	2 hours total	1 hour total

Section 4 - Detailed Teaching Syllabus

Learning Objectives	Reference	Teaching Aid
<p>1. National and International Regulations</p> <p>1.1 Scope of responsibilities and authority to act (local/regional/national/international)</p> <p>1.1.1 Distress</p> <p>1.1.2 Marine pollution (land/air/water)</p> <p>1.2 Local regulations, Bye Laws</p> <p>1.3.1 Supporting and Allied Services</p> <p>1.3.1.1 Define the supporting and allied services which might be available</p> <p>1.3.1.2 Define the assets which might be available for deployment</p>	<p>R7, R15, R24, R29, R49</p> <p>R51</p> <p>R53</p>	
<p>2. Contingency Plans</p> <p>2.1 Introduction, preparation and implementation of contingency plans</p> <p>2.1.1 Collisions</p> <p>2.1.1.1 Organisations to be alerted</p> <p>2.1.2 Groundings</p> <p>2.1.2.1 Organisations to be alerted</p> <p>2.1.3 Marine Pollution (Air/Water)</p> <p>2.1.3.1 Organisations to be alerted</p> <p>2.1.4 Fire</p> <p>2.1.4.1 Organisations to be alerted</p> <p>2.1.5 Hazardous cargoes</p> <p>2.1.5.1 Organisations to be alerted</p> <p>2.1.6 SAR Incidents, including man overboard</p> <p>2.1.6.1 Organisations to be alerted</p>	<p>R15, R17, R51, R53, R54</p>	

Learning Objectives	Reference	Teaching Aid
<p>2.1.7 Other contingency plans (medical, casualty evacuation, special weather conditions)</p> <p>2.1.7. 1 Organisations to be alerted</p> <p>2.1.8 Simultaneous emergencies</p> <p>2.1.8. 1 Organisations to be alerted</p> <p>2.2 Preparation and use of checklists</p> <p>2.2.1 Introduction to checklists</p> <p>2.2.1.1 Description of a checklist</p> <p>2.2.1.2 Authority to prepare, implement, issue and update checklists</p>	<p>R55</p>	
<p>3 Prioritise and respond to incidents</p> <p>3.1 Ascertain nature of incident by data collection and evaluation</p> <p>3.1.1 Collisions</p> <p>3.1.2 Groundings</p> <p>3.1.3 Marine Pollution</p> <p>3.1.4 Fire</p> <p>3.1.5 Hazardous cargoes</p> <p>3.1.6 SAR incidents</p> <p>3.1.7 Other special circumstances</p> <p>3.2 Commence alerting procedures</p> <p>3.2.1 Collisions</p> <p>3.2.2 Groundings</p> <p>3.2.3 Marine Pollution</p> <p>3.2.4 Fire</p> <p>3.2.5 Hazardous cargoes</p> <p>3.2.6 SAR incidents</p> <p>3.2.7 Other special circumstances</p>	<p>R15, R17</p> <p>R15, R17, R29, R53, R55</p>	<p>A14</p>

Learning Objectives	Reference	Teaching Aid
3.3 Navigational Warnings	R50	
4. Co-ordination with, and support to, allied services 4.1 Maintaining communications with response units and traffic during incidents 4.1.1 Collisions 4.1.2 Groundings 4.1.3 Marine Pollution 4.4.4 Fire 4.1.5 Hazardous cargoes 4.1.6 SAR incidents 4.1.7 Emergencies resulting from other circumstances 4.2 Updating of situation reports	R15, R 17, R29, R51, R55 R53, R55	
5. Record activities relating to emergency situations 5.1 Objective of recording activities during emergency situations 5.2 Introduction to methods of recording activities during emergency situations 5.3 Information which should be recorded 5.4 Security of recorded information	R17, R53, R55	

Learning Objectives	Reference	Teaching Aid
<p>6. Maintaining a safe waterway throughout emergency situations</p> <p>6.1 Maintaining traffic management and monitoring procedures</p> <ul style="list-style-type: none"> 6.1.1 Alternative Routing arrangements 6.1.2 Diversionary procedures (traffic in immediate incident area) 6.1.3 Anchorage areas 6.1.4 Introduction of emergency speed restrictions 6.1.5 Emergency alterations to VTS Sailing Plans and Passage Plans 	<p>R 17, R53, R55</p>	<p>A14</p>
<p>7. Internal/External emergencies</p> <p>7.1 Procedures for individual emergencies</p> <ul style="list-style-type: none"> 7.1.1 Checklists <p>7.2 Maintenance of VTS Operations</p> <ul style="list-style-type: none"> 7.2.1 Communications 7.2.2 Traffic image 	<p>R17, R53, R55</p>	

