**ANNEX**

**DRAFT REVISED MODEL COURSE 1.25 ON GENERAL OPERATOR'S CERTIFICATE FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)**

MODEL COURSE 1.25

**GENERAL OPERATOR'S**

**CERTIFICATE FOR THE**

**GLOBAL MARITIME DISTRESS**

**AND SAFETY SYSTEM**

20xx Edition

Course + Compendium

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# Introduction

* Purpose of the model course

The purpose of an IMO model course is to assist organizations that focus on maritime training with the development and introduction of courses. This also includes updating and improving existing courses so that the quality and effectiveness of seafarers' training may be consistent internationally.

It is not the intention of the model course programme to present instructors with a rigid "teaching package" which they are expected to "follow blindly". Nor is it the intention to substitute audio-visual or "programmed" material for the instructor's presence. As in all training endeavours, the knowledge, skills and dedication of the instructor are the key components in the transfer of knowledge and skills to those being trained through IMO model course material.

Therefore, this model course should be used as a framework for course providers in developing their respective education and training programmes.

Because the educational systems and the cultural backgrounds of trainees in maritime subjects vary considerably from throughout the world, the model course material has been designed to identify the basic entry requirements and trainee target group for each course in universally applicable terms, and to specify clearly the technical content and levels of knowledge and skill necessary to meet the intent of IMO and other related instruments.

* Use of the model course

To use the model course effectively, instructors should review the general outline in part B and detailed outline in part C, taking into account the information on the entry standards specified in the course framework in part A. The trainees' level of knowledge, skills and prior technical education should be kept in mind during this review, and any areas within the detailed outline which may cause difficulties due to differences between the actual level of trainees and the level assumed by the course developer should be identified. To compensate for such differences, instructors may delete from the course, or reduce the emphasis on, items dealing with knowledge or skills already attained by the trainees. Instructors should also identify any academic knowledge, skills or technical training which the trainees may not have acquired prior to undertaking the course.

By analysing the detailed outline and the academic knowledge required to allow training in the technical area to proceed, instructors can develop an appropriate pre-entry course or, alternatively, insert the elements of academic knowledge required to support the technical training elements concerned at appropriate points within the technical course.

Adjustment of the course objectives, scope and content may also be necessary if, in their maritime industry, the trainees completing the course are to undertake duties which may differ from the objectives specified in the model course.

* Lesson Plans

Having adjusted the course content to suit the trainee intake and following adjustment of the course objectives, if any, instructors should draw up lesson plans based on the detailed outline (part C). The detailed outline contains specific references to the proposed teaching materials for use in the course. Where no adjustment to the learning objectives of the detailed outline has been found necessary, the lesson plans may simply consist of the syllabus with keywords or other reminders added to assist the instructors in presenting the material.

* Presentation

The presentation of concepts and methodologies should be repeated in various ways until instructors are satisfied that the trainees have attained each specified learning objective. Detailed outline in part C is laid out in learning objective format and each objective specifies what the trainee should be able to perform as the learning outcome.

* Implementation

For the course to run smoothly and to be effective, considerable attention must be paid to the availability

and use of:

.1 properly qualified instructors;

.2 relevant support staff;

.3 teaching and other spaces;

.4 simulator, appropriate equipment and teaching aids;

.5 videos, multi-media presentations;

.6 textbooks, appropriate technical papers, etc; and

.7 other relevant reference material.

Sound and effective preparation is the key to successful implementation of the course. The IMO has produced *Guidance on the implementation of IMO model courses*, which deals with this aspect in greater detail and is included as an appendix to this model course.

**■ Training and the applicable instruments**

The minimum standards of competence that should be met by trainees are defined in the Seafarers’ Training, Certification and Watchkeeping Code (STCW Code) and the Radio Regulation developed by the International Telecommunication Union (ITU). This IMO model course provides guidance to achieve the standards of competence set out in table A-IV/2 of the STCW Code, taking into account the guidance set out in section B-IV/2 therein, and those set out in table 47-1 of the Radio Regulations.

**Part A (Course framework):** provides the framework for the course with its aims and objectives and notes on the suggested teaching facilities and equipment. A list of useful teaching aids, IMO/ITU references and textbooks is also included.

**Part B (General outline):** provides a general outline of lectures, demonstrations and exercises for the course. Also included in this section is note for suggested education and training duration.

**Part C (Detailed outline):** sets out the detailed outline, based on the theoretical and practical knowledge specified in the STCW Code and the Radio Regulations. It is written as a series of learning objectives; in other words, what the trainee is expected to be able to perform as a result of the teaching and training. Each of the objectives is expanded to define a required performance of knowledge, understanding and proficiency (KUP). IMO/ITU references, textbook references and suggested teaching aids are included to assist instructors in designing lessons.

**Part D (Instructor manual):** provides guidance notes and additional explanations to instructors on the topics and learning outcomes listed in part C. It discusses specifics about each topic and sub-topic. These specifics include, but are not limited to subject matter details, recommended presentation and assessment techniques. It is numbered and subdivided in the same manner as part B above.

**Part E (Evaluation and assessment):** presents information to be considered concerning effective, objective evaluation and assessment. These suggestions are not inclusive and instructors may use various assessment techniques which are recognized in evaluating competence. The criteria for evaluating competence is included in column 4 of table A-IV/2 of the STCW Code.

Mandatory provisions concerning training and assessment are given in section A-I/6 of the STCW Code, which cover: qualifications of instructors, supervisors and assessors; in-service training; assessment of competence; and training and assessment within an institution. The corresponding part B of the STCW Code contains non-mandatory guidance on training and assessment.

**■ Validation**

This model course has been validated by the Sub-Committee on Human Element, Training and Watchkeeping for the use of course providers in developing relevant education and training programmes and courses which should be consistent with the requirements of IMO and other related instruments. Validation in this context means that the Sub-Committee has found no grounds to object to the contents of this model course, but has not granted its approval to the document as the Sub-Committee does not consider any model course to be an official interpretation of IMO instruments.PART A: Course Framework

* Aim

The overall aim of this model course is to facilitate training of trainees so they can meet the mandatory minimum standards of competence and the relevant requirements in general operator's certificates for the Global Maritime Distress and Safety System (GMDSS), as specified in table A-IV/2 of the STCW Code and table 47-1 of the Radio Regulations.

* Scope

This model course is designed to provide trainees with the required knowledge and skills in general operator's certificates for the GMDSS. This covers the competences and the required knowledge, understanding and proficiencies (KUPs) specified in table A-IV/2 of the STCW Code, taking into account the guidance set out in section B-IV/2 therein, and table 47-1 of the Radio Regulations.

The course is revised to meet the relevant provisions of the Radio Regulations and the STCW Code that were valid at the time of publishing.

* Objective

The objective is to provide trainees with guidance and information enabling them to gain the KUPs required to achieve the objectives of the learning outcomes as general operators of the GMDSS. The trainees should demonstrate the standard of competence in general operator's certificates for the GMDSS.

The trainees who successfully complete the training course should be able to demonstrate their competence, including to:

.1 transmit and receive information using GMDSS subsystems and equipment and fulfilling the functional requirements of GMDSS; and

.2 provide radio services in emergencies.

* Entry standards

Entry standards should be in accordance with the STCW Convention or other applicable IMO instruments, where such requirements are specified. If such requirements are not specified, it is left to the Administration to decide entry standards in accordance with national regulations and system of education.

* Course certificate or document

On a trainee's successful completion of the training course and demonstration of the required competences, a document may be issued certifying that the holder has met the applicable standard of competence and requirements specified in table A-IV/2 of the STCW Code and in table 47-1 of the Radio Regulations. This would facilitate the issuance of a certificate by the Administration confirming that the holder has completed approved training and met the applicable standard of competence of general operator for the global maritime distress and safety system.

* Course intake limitations

The maximum number of trainees attending each session will depend on the availability of adequate numbers of instructors, equipment and facilities needed to conduct the training. The course intake is limited by the number of trainees who can receive adequate individual attention from Instructors. The maximum trainee - instructor ratio may be up to 24 to 1 for classroom lectures, and 8 to 1 for practical sessions. Teaching staff should note that the ratios can be adapted, within the suggested ratios, to suit individual groups of trainees depending on their experience and ability, and the equipment available.

* Staff requirements

Instructors, supervisors and assessors are to be appropriately qualified in accordance with the STCW Convention, other applicable IMO instruments or the Radio Regulations for the particular types and levels of training or assessment of competence of the trainees. It is left to the Administration to decide staff requirements in accordance with their national regulations.

* Teaching facilities and equipment

Radiocommunications simulation equipment must meet all applicable performance standards set out in Regulation I/12 of the STCW Convention.

The lecture portion of the course should take place in any suitable classroom with adequate desk/seating space for all trainees. Standard classroom facilities must be available such as whiteboard/chalkboard, appropriate projection system, etc.

For practical training, adequate working space and separate parallel working areas are recommended. The following equipment is the minimum recommended:

.1 One fully operational MF/HF transmitter/receiver set for radiotelephony, NBDP and DSC (an additional DSC controller is recommended since local communications over a hard- wired back-to-back connection between DSC controllers then becomes possible);\*

.2 One dummy EPIRB (406 MHz) with hydrostatic release mechanism;

.3 One dummy radar SART;

.4 One dummy AIS-SART;

.5 One fully operational EGC receiver (a suitable Inmarsat or Iridium SES covers that requirement on board);\*

.6 One dummy Distress alarm panel for passenger ships, connected to VHF-DSC, MF-DSC and SES (e.g. Inmarsat-C, Inmarsat Fleet Safety, or Iridium GMDSS terminal);

.7 One NAVTEX receiver (this equipment should preferably be a full operational NAVTEX receiver if located within the coverage of a NAVTEX coast station, otherwise this could be a dummy NAVTEX receiver);

.8 One fully operational VHF transmitter/receiver for radiotelephony and DSC, incorporating a DSC watch receiver for channel 70 (it should be possible to go on the air with it);\*

.9 One (dummy or fully operational) portable two-way VHF radiotelephone apparatus with charging arrangement;

.10 One dummy on-scene (aeronautical) portable two-way VHF radiotelephone apparatus;

.11 One training network with personal computers and realistic simulation equipment (per each trainee), capable of running relevant programs for simulating Distress, Urgency, Safety and Routine communications on Inmarsat and Iridium satellite systems, VHF/MF/HF, DSC, NBDP and NAVTEX, as appropriate;

.12 One battery inverter power supply, connected as the reserve source of energy (not necessarily located in the working area) or a reserve source of energy (radio batteries) connected to the charging arrangement (re.: COMSAR.1/Circ.32/Rev.2); and

.13 Sign and marking in accordance with the requirements of the administrations for GMDSS ship stations.

**Note** Radiocommunications training equipment (real equipment) should be installed in such a way that it corresponds with the installation of such equipment on board SOLAS ships.

**Note** Radiocommunications training simulators have to provide all communication requirements. This means, that the simulator should simulate the features of the designated simulated equipment in distress, urgency, safety and routine communications. It shall be possible to simulate the contact to ship stations as well as to all kinds of coast stations in a network of computers.

**Note** Throughout the course, safe working practices are to be clearly defined and emphasized with reference to current international requirements and regulations.

\*Two sets of equipment connected back to back would prove advantageous.

* Teaching aids (A)

A1 GOC Model Course (model course 1.25) Compendium

A2 PC programme in a network, including documentation, for the simulation of:

1 Inmarsat and Iridium GMDSS satellite systems including EGC

2 Narrow Band Direct Printing (NBDP);

3 Digital Selective Calling (VHF-DSC, MF/HF-DSC); and

4 NAVTEX;

A3 Log-book

A4 Demonstration equipment (EPIRB, radar SART, AIS-SART, Distress alarm panel, portable two-way VHF radiotelephone apparatus and on-scene (aeronautical) portable two-way VHF radiotelephone apparatus)

A5 Operational equipment (VHF-DSC, MF/HF including NBDP and DSC, NAVTEX receiver, GMDSS satellite systems SES, portable two-way VHF radiotelephone apparatus)

A6 Videos on Cospas-Sarsat system and the use of EPIRB available on the International Cospas-Sarsat Programme web site: <https://cospas-sarsat.int>

* IMO and ITU References (R)

R1  GMDSS Manual

R2 International Convention on Maritime Search and Rescue (SAR), 1979

R3 International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual

R4 IMO Standard Marine Communication Phrases (SMCP)

R5 International Code of Signals

R6 Master Plan for the GMDSS (to be available online via the IMO GISIS)

R7 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention), 1978

R8 Guidelines for the avoidance of false distress alerts (Resolution MSC.514(105))

R9 International Convention for the Safety of Life at Sea (SOLAS), 1974

R10 Harmonization of GMDSS requirements for radio installations on board SOLAS ships (COMSAR.1/Circ.32/Rev.2)

R11 NAVTEX Manual (MSC.1/Circ.1403/Rev.2)

R12 International SafetyNET Services Manual (MSC.1/Circ.1364/Rev.2)

R13 Iridium SafetyCast Manual (MSC.1/Circ.1613/Rev.2)

R14 ITU Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services (Maritime Manual)

R15 ITU List of Coast Stations and Special Service Stations (List IV)

R16 ITU List of Ship Stations and Maritime Mobile Service Identity Assignments (List V)

The latest versions of the following document available on <https://www.itu.int>

R17 Radio Regulations (RR)

R18 Recommendation ITU-R M.493

R19 Recommendation ITU-R M.541

R20 Recommendation ITU-R M.585

R21 Recommendation ITU-R M.625

R22 Recommendation ITU-R M.633

R23 Recommendation ITU-R M.1170

R24 Recommendation ITU-R M.1171

R25 Recommendation ITU-R M.1172

R26 Recommendation ITU-R M.1082

R27 Recommendation ITU-T D.90

* Textbooks (T)

T1 User manuals for all installed or simulated GMDSS equipment

T2 Inmarsat GMDSS user manual

T3 Iridium GMDSS user manual

T4 Nautical publications related on radio stations and GMDSS

# PART B: Course Outline and Timetable

**■ Lectures**

As far as possible, lectures should be presented within a familiar context and should make use of practical examples. They should be well illustrated with diagrams, pictures, charts and videos where appropriate, and should be related to those competences that will be necessary for the performance of duties on board ships.

An effective manner of presentation would be to develop techniques to transfer information and then reinforce the information. For example, share with the trainees briefly what instructors are going to present to them; then cover the topic in detail; and, finally, summarize what you have shared with them. The use of audio-visual aids, handouts and notes will contribute to the effectiveness of the learning process.

**■ Timetable**

This model course has been developed providing a recommended range in duration of 110 to 115 hours for lectures, demonstrations, laboratories or simulator exercises and assessment. No formal timetable is included in this model course.

The recommended range of total hours is not binding and instructors must develop their own timetable depending on:

.1 the level of skills of trainees;

.2 the number of trainees;

.3 the number of instructors; and

.4 simulator facilities and equipment available,

and normal practices at the training establishment.

* Course Outline

The table below lists the competences and of the knowledge, understanding and proficiencies (KUPs) for this course in the sequence that they are listed in table A-IV/2 of the STCW Code and in table 47-1 of the Radio Regulations.

The trainees who successfully complete the training course should be able to demonstrate their competence, including to efficiently operate the GMDSS equipment required to be fitted on ships navigating in sea areas A1, A2, A3 or A4 and to have primary responsibility to undertake radio communications during distress-, urgency-, safety incidents and for general radiocommunication purposes. Given the adverse impact of false Distress alerts that might sometimes occur in large numbers in the GMDSS, training will also be provided in techniques to avoid the unintentional transmission of Distress alerts and the procedures to use in order

The course outline should be read in conjunction with part D (Instructor manual) and the compendium for further detailed guidance.

| **Subject Area** |
| --- |
| Introduction |
| The statutory framework of the Maritime Mobile ServiceInternational Convention for the Safety of Life at Sea (SOLAS Convention), 1974Radio Regulations |
| Identification of Radio StationsIdentification of Ship StationsIdentification of Coast StationsIdentification of Aids to Navigation (AtoN)Identification of SAR Aircraft StationsMaritime identities used for maritime for special purposes |
| Service PublicationsList of Coast Stations and Special Service Stations (ITU List IV)List of Ship Stations and Maritime Mobile Service Identity Assignments (ITU List V)Manual for use by the Maritime Mobile and Maritime Mobile-Satellite ServicesNautical publications |
| TechnicalRadio wave propagationModulation basicsTransmitter and receiver basicsBatteriesAntennasDSC basicsRadiotelex basicsFault location and service on GMDSS marine electronic equipment |
| GMDSS ComponentsGeneral, including safety precautionsVHF DSCMF/HF DSCVHF/MF/HF/ Voice ProcedureRadiotelexRecognized Mobile Satellite ServicesCospas/SarsatEmergency Position Indicating Radio Beacon (EPIRB)Search and Rescue radar Transponder and AIS Search and Rescue TransmitterMaritime safety information and search and rescue related informationThe use and functions of portable two-way VHF radiotelephone apparatusOn-scene (aeronautical) portable two-way VHF radiotelephone apparatus |
| Other Systems used on boardUltra-High Frequency (UHF) HandheldsAutomatic Identification SystemShip Security Alert System |
| Search and Rescue operationSearch and rescue as a systemThe role of the Rescue Co-ordination Centre (RCC)Shore-based SAR communication network and operationInternational Aeronautical and Maritime Search and Rescue (IAMSAR) Manual |
| Role and Method of use of ship reporting SystemsAutomated Mutual-assistance Vessel Rescue SystemJapanese Ship Reporting SystemModernized Australian Ship Tracking and Reporting SystemLong Range Identification and Tracking of Ships (LRIT) |
| Miscellaneous skills and operational procedures for general radiocommunicationsUse of English in written and oral form for communicationsProcedure of traffic charging |

**Note:**

The total course duration is for guidance only and may be adjusted taking into account the entry qualifications, prior knowledge in radiocommunications or seagoing experience, provided that the learning objectives contained in part C of this course are fully achieved. In addition, any adjustment should take into account the need to maintain an effective instructor to trainee ratio and adequate access to GMDSS equipment for practical training during the course.

# PART C: Detailed Teaching Syllabus

**■ Introduction**

Part C correlates the KUPs and requirements defined in the STCW Code and the Radio Regulations, with the specific learning outcomes that the trainees should achieve. Each specific outcome is presented as a topic or sub-topic as a learning objective reflecting the KUPs and requirements in table A-IV/2 of the STCW Code and table 47-1 of the Radio Regulations.

**■ Learning objectives**

The detailed outline has been developed in learning objective format where the objective describes what trainees should perform in order to demonstrate that knowledge and skill have been transferred, and the desired competence has also been achieved. All objectives are understood to be prefixed by the words "The expected learning outcome is that the trainee is able to …"

**■ References and teaching aids**

To assist instructors, references are shown against the learning objectives to indicate the IMO/ITU references, textbooks, additional technical material and teaching aids which the instructor may wish to use when preparing course material. The material listed in the course framework (part A) has been used to structure the detailed outline; in particular,

– Teaching aids (indicated by A);

– IMO and ITU references (indicated by R); and

– Textbooks (indicated by T),

will provide valuable information to instructors.

The abbreviations used in the detailed outline are:

– AP Appendix

– Art. Article

– Ch. Chapter

– col. column

– Reg. Regulation

– Res. Resolution

– Sect. Section

* Note

Throughout the course, instructors should clearly define and emphasize the application of safe working practices considering references to applicable national and international requirements and regulations, as appropriate. It is expected that the national institutions implementing the training course will insert references, where appropriate, to national and/or regional requirements and regulations, as necessary.

* Knowledge, Understanding and Proficiency (KUP)

Subject Areas and topics have been outlined in Part B. In Part C, the KUPs associated with each topic are provided, along with teaching aids and references. The KUPs are further described in sufficient detail in the Compendium for the development of training course material. The instructor should bear in mind that the overarching competencies to be developed throughout the course are the "transmit and receive information using GMDSS subsystems and equipment and fulfilling the functional requirements of GMDSS" and "provide radio services in emergencies" (section A-IV/2 and table A-IV/2 of the STCW Code). The GOC instructor should strive to present all of the Knowledge, Understanding and Proficiency in or as close to the contexts of real conditions as possible.

| **Knowledge, understanding and proficiency** | **IMO / ITU Reference** | **Teaching Aids** |
| --- | --- | --- |
| **1. Introduction** |  |  |
| **2. The statutory framework of the Maritime Mobile Service** | R9, R17 | A1 Sect.2 |
| **2.1 International Convention for the Safety of Life  at Sea (SOLAS Convention), 1974** | R9 Ch.IV | A1 Sect.2.1 |
| 2.1.1 Functional requirements | R9 Ch.IV Reg.4 |  |
| *The expected learning outcome is that the trainee is able to*   1. *retain the 9 functional requirements of GMDSS* |  |  |
| 2.1.2 Sea Areas | R9 Ch.IV Reg.2 |  |
| *The expected learning outcome is that the trainee is able to*   1. *define the Sea Areas* |  |  |
| 2.1.3 Carriage requirements | R9 Ch.IV Reg.6-11 |  |
| 2.1.3.1 Details of equipment specifications for sea areas A1, A2,A3 and A4 | R9 Ch.IV Reg.8-11, R10 |  |
| 2.1.3.2 Details of carriage requirements | R9 Ch.IV Reg.6 and 7, R10 |  |
| 2.1.3.3 Maintenance requirements for ship radio installations | R9 Ch.IV Reg.15 |  |
| 2.1.3.4 Primary and secondary means of alerting | R9 Ch.IV Reg.4, Reg. 8-11 |  |
| 2.1.3.5 Distress panel and its purpose | R9 Ch.IV Reg.6, Reg. 9-11 |  |
| 2.1.3.6 Requirements for radio safety certificates | R9 Ch.I Reg.12-13 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the type of equipment for each Sea Area* 2. *understand the difference between primary and secondary equipment* 3. *identify radio equipment use for duplication* 4. *list the different ship radio installation maintenance methods* 5. *understand the use of the Distress panel* 6. *recognize the different radio equipment listed on the radio safety certificate* |  |  |
| 2.1.4 Watchkeeping |  |  |
| 2.1.4.1 Watchkeeping procedures as defined in the Radio Regulations | R17 Ch.VII Sect. III |  |
| 2.1.4.2 Other watchkeeping procedures | R7, R9 Ch.IV Reg.12 | T4 |
| *The expected learning outcome is that the trainee is able to*   1. *monitor automatic radio watch with different GMDSS equipment* 2. *implement radio watch on VHF channel 16 when practicable* 3. *identify frequencies to be watch in dedicated areas* |  |  |
| 2.1.5 Radio Operators | R7, R9 Ch.IV Reg.16 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the appropriate qualification to operate different radio equipment as defined in STCW Convention* |  |  |
| 2.1.6 Sources of energy | R9 Ch.IV Reg.13 |  |
| 2.1.6.1 Emergency source of electrical power | R10 |  |
| 2.1.6.2 Reserve source of energy, capacity and duration as  defined in the SOLAS Convention | R10 |  |
| 2.1.6.3 Prohibitions on the connection of non-GMDSS equipment | R9 Ch.IV Reg.14 |  |
| *The expected learning outcome is that the trainee is able to*   1. *explain the difference between the main, emergency and reserve source of energy* 2. *remember the duration to operate a radio station for a cargo and passenger ship* |  |  |
| **2.2 Radio Regulations** | R17 | A1 Sect.2.2 |
| 2.2.1 Authority of the master | R17 Ch.IX Art.46 |  |
| *The expected learning outcome is that the trainee is able to*   1. *itemize the authority of the master* |  |  |
| 2.2.2 Secrecy of correspondence | R17 Ch.V Art.17 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the secrecy of telecommunications* |  |  |
| 2.2.3 Ship station licences | R17 Ch.V Art.18 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the ship station licence* |  |  |
| 2.2.4 Inspection of stations | R17 Ch.IX Art.49 |  |
| *The expected learning outcome is that the trainee is able to*   1. *describe the inspection of a ship radio station* |  |  |
| 2.2.5 Radio Operator's Certificates | R17 Ch.IX Art.47 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the appropriate qualification to operate different radio equipment as defined in the RR* |  |  |
| 2.2.6 Frequencies | R17 Ch.II |  |
| 2.2.6.1 Interferences | R17 Ch.IV Art.15, 16 |  |
| 2.2.6.2 The use of and restrictions for different emissions according  to frequencies in the Maritime Mobile Service (MMS) | R17 AP1 |  |
| 2.2.6.3 The role of the various modes of communication | R17 AP1 |  |
| 2.2.6.4 The use of MF, HF, VHF, UHF  and SHF frequency bands in the MMS | R17 Ch.II Art.5 |  |
| 2.2.6.5 The concept of HF frequency management | R17 AP17 |  |
| 2.2.6.6 VHF telephony | R17 AP18 |  |
| 2.2.6.7 Frequencies for Distress, Urgency and  Safety communications | R17 AP15 |  |
| 2.2.6.8 Frequencies for general radiocommunications | R17 AP17, AP18 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the global management of frequency spectrum* 2. *understand the global management of frequency spectrum* 3. *identify the frequency bands used in the MMS* |  |  |
| 2.2.7 Call priorities | R17 Ch.IX Art.53 |  |
| 2.2.7.1 Distress |  |  |
| 2.2.7.2 Urgency |  |  |
| 2.2.7.3 Safety |  |  |
| 2.2.7.4 Other |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *recognize the 4 levels of priority in radiocommunications* |  |  |
| 2.2.8 Watchkeeping | R17 Ch.VII Sect. III Art.31.12-31.20 |  |
| *The expected learning outcome is that the trainee is able to*   1. *monitor automatic radio watch with different GMDSS equipment* 2. *implement radio watch on VHF channel 16 when practicable* 3. *identify frequencies to be watch in dedicated areas* |  |  |
| 2.2.9 Radio record-keeping (Log Book) | R9 Ch.IV Reg.17, R17 AP 16 | A3 |
| *The expected learning outcome is that the trainee is able to*   1. *log information in the Radio Log Book* |  |  |
| **3. Identification of radio stations** | R17 Ch.V Art.19 | A1 Sect.3 |
| **3.1 Identification of ship stations** | R9 Ch.IV Reg.5-1, R17 Ch.V Art.19 | A1 Sect.3.1 |
| 3.1.1 Ship name | R17 Ch.V Sect.IV |  |
| 3.1.2 Call sign | R17 Ch.V Art.19 Sect.III |  |
| 3.1.3 Maritime Mobile Service Identity | R19 Ch.V Art.19 Sect.VII, R19 |  |
| 3.1.4 Group ship calling number | R20 |  |
| 3.1.5 Identification to craft associated with a parent ship | R20 |  |
| 3.1.6 Identification of Ship Earth Stations | R20 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify ship radio stations* 2. *recognize the type of station or group of stations with the MMSI* 3. *identify a SES identification number* |  |  |
| **3.2 Identification of coast stations** | R17 Ch.V Sect.IV, R20 | A1 Sect.3.2 |
| 3.2.1 Identification of specific coast stations | R20 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify a coast radio station* |  |  |
| **3.3 Identification of Aids to Navigation (AtoN)** | R20 | A1 Sect.3.3 |
| *The expected learning outcome is that the trainee is able to*   1. *identify an AtoN station* |  |  |
| **3.4 Identification of SAR aircraft stations** | R20 | A1 Sect.3.4 |
| *The expected learning outcome is that the trainee is able to*   1. *identify a SAR aircraft station* |  |  |
| **3.5 Maritime identities used for other maritime devices for special purposes** | R20 | A1 Sect.3.5 |
| 3.5.1 Handheld VHF transceiver with DSC and integral  GNSS receiver | R20 |  |
| 3.5.2 Devices using a freeform number identity | R20 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify handheld VHF transceiver with the MMSI* 2. *identify other devices using freeform number identity* |  |  |
| **4. Service publications** | R17 Ch.V Art.20 | A1 Sect.4 |
| **4.1 List of Coast Stations and  Special Service Stations (ITU List IV)** | R15 | A1 Sect.4.1 |
| **4.2 List of Ship Stations and Maritime Mobile  Service Identity Assignments (ITU List V)** | R16 | A1 Sect.4.2 |
| **4.3 Manual for use by the Maritime Mobile and  Maritime Mobile-Satellite Services** | R14 | A1 Sect.4.3 |
| **4.4 Nautical publications** | R9 Ch.V Reg.27 | A1 Sect.4.1, T4 |
| *The expected learning outcome is that the trainee is able to*   1. *find information on a radio station in the appropriate documentation* |  |  |
| **5. Technical** |  | A1 Sect.5 |
| **5.1 Radio wave propagation** | R17 Ch.II Sect.I | A1 Sect.5.1 |
| 5.1.1 Basics |  |  |
| 5.1.2 Line of sight propagation |  |  |
| 5.1.3 Ground waves and sky waves |  |  |
| 5.1.4 Ionosphere structure |  |  |
| 5.1.5 UHF and VHF propagation |  |  |
| 5.1.6 MF propagation |  |  |
| 5.1.7 HF propagation |  |  |
| 5.1.8 VLF propagation |  |  |
| 5.1.9 LF propagation |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the radio line of sight wave propagation* 2. *understand the radio ground wave propagation* 3. *understand the radio sky wave propagation* 4. *calculate the equivalence between frequency and wavelength* |  |  |
| **5.2 Modulation basics** |  | A1 Sect.5.2 |
| 5.2.1 Frequency modulation | R17 AP 1 Sect.II |  |
| 5.2.2 Amplitude modulation | R17 AP 1 Sect.II |  |
| 5.2.3 Bandwidth of different types of modulation |  |  |
| 5.2.4 Carrier and assigned frequencies |  |  |
| 5.2.5 Official designations of emissions | R17 AP1 |  |
| 5.2.6 Unofficial designations of emissions |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *explain frequency modulation* 2. *explain amplitude modulation* 3. *explain the uses and restrictions for different emissions according to frequency and purpose in the maritime bands* 4. *quote official designations of emissions* 5. *quote unofficial designations of emissions* |  |  |
| **5.3 Transmitter and receiver basics** |  | A1 Sect.5.3 |
| 5.3.1 Transmitter structure |  |  |
| 5.3.2 Receiver structure |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *describe basic transmitter components* 2. *describe basic receiver components* |  |  |
| **5.4 Batteries** |  | A1 Sect.5.4 |
| 5.4.1 Basics |  |  |
| 5.4.2 Different kinds of batteries - UPS systems |  |  |
| 5.4.3 Characteristics of different battery types |  |  |
| 5.4.3.1 Primary batteries |  |  |
| 5.4.3.2 Secondary batteries |  |  |
| 5.4.4 Charging batteries, battery charging methods |  |  |
| 5.4.5 Maintenance and monitoring of batteries | R7 Table A-IV/2 col.2 |  |
| *The expected learning outcome is that the trainee is able to*   1. *quote different battery types* 2. *list the characteristics of different battery types* 3. *indicate precautions to be taken in monitoring of batteries* 4. *indicate precautions to be taken in maintenance of batteries* |  |  |
| **5.5 Antennas** |  | A1 Sect.5.5 |
| 5.5.1 VHF antennas |  |  |
| 5.5.2 MF/HF antennas |  |  |
| 5.5.3 Satellite antennas |  |  |
| 5.5.4 Antenna maintenance | R7 Table A-IV/2 col.2 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the different antenna types* 2. *quote preventive measures to ensure the safety of the ship and personnel from risks associated with radio equipment, including hazards from electricity and non-ionizing radiation* |  |  |
| **5.6 DSC basics** | R18, R19 | A1 Sect.5.6 |
| 5.6.1 Phasing sequence | R18, R19 |  |
| 5.6.2 Format specifier | R18, R19 |  |
| 5.6.3 Address | R18, R19 |  |
| 5.6.4 category | R18, R19 |  |
| 5.6.5 Self-identification | R18, R19 |  |
| 5.6.6 Call sequence | R18, R19 |  |
| 5.6.7 Call content | R18, R19 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the Digital Selective Calling* |  |  |
| **5.7 Radiotelex basics** | R18, R19 | A1 Sect.5.7 |
| 5.7.1 Automatic request for repeat (ARQ) | R21 |  |
| 5.7.2 Forward Error Correction (FEC) | R21 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the automatic request for repeat (ARQ) mode* 2. *understand the forward error correction (FEC) mode* |  |  |
| **5.8 Fault location and service on GMDSS marine  electronic equipment** | A2 | A1 Sect.5.8, T1, T2, T3 |
| *The expected learning outcome is that the trainee is able to*   1. *find information on a radio equipment in the appropriate documentation* |  |  |
| **6. GMDSS Components** | R1 | A1 Sect.6 |
| **6.1 General, including safety precautions** | R1, R7 Table A-IV/2 col.2 | A1 Sect.6.1 |
| *The expected learning outcome is that the trainee is able to*   1. *remember the first rule in terrestrial radio services* 2. *quote safety measures for the safety of ship and personnel for hazards related to radio equipment including electrical and non-ionizing radiation hazards* |  |  |
| **6.2 VHF DSC** |  | A1 Sect.6.2 |
| 6.2.1 Basics |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the range of VHF with the power of the transmitter* 2. *explain the simplex operation of VHF* 3. *explain the duplex operation of VHF* |  |  |
| 6.2.2 The use and functions of the VHF radio station installation | R19 | A2, A5 |
| *The expected learning outcome is that the trainee is able to*   1. *indicate the different parts of the VHF radio station* |  |  |
| 6.2.3 DSC possibilities | R18 |  |
| *The expected learning outcome is that the trainee is able to*   1. *quote the different class of VHF equipment* 2. *identify the possibilities of class A VHF equipment* |  |  |
| 6.2.4 Operational VHF DSC procedures in the GMDSS | R17 Ch.VII Art.30-33, R18 | A2, A5 |
| 6.2.4.1 Telecommand and traffic information | R18, R19 |  |
| 6.2.4.2 Channel selection in call format | R18, R19 |  |
| 6.2.4.3 DSC acknowledgement | R18, R19 |  |
| 6.2.4.4 DSC relay process | R18, R19 |  |
| 6.2.4.5 Test transmissions | R18, R19 |  |
| *The expected learning outcome is that the trainee is able to*   1. *Understand the operational VHF DSC procedures* |  |  |
| 6.2.5 Alerting and announcement | R17 Ch.VII Art.32, R19 | A2, A5 |
| 6.2.5.1 Distress alert |  |  |
| 6.2.5.2 Distress alert relay |  |  |
| 6.2.5.3 Cancellation of an inadvertent distress alert |  |  |
| 6.2.5.4 Announcements for all ships (Urgency and Safety) | R17 Ch.VII Art.33, R19 |  |
| 6.2.5.5 Announcement to individual station (Urgency, Safety and Other) | R16 Ch.VII Art.33, R19 |  |
| 6.2.5.6 Acknowledgement of a received individual call | R19 |  |
| 6.2.5.7 Group announcement (Urgency, Safety and Other) | R19 |  |
| 6.2.5.8 Polling and position request | R18, R19 |  |
| 6.2.5.9 Automatic/Semi-automatic service with coast stations | R18, R19 |  |
| *The expected learning outcome is that the trainee is able to*   1. *implement a distress alert* 2. *implement a distress alert relay* 3. *cancel an inadvertent distress alert* 4. *implement an Urgency or Safety announcement for all ships* 5. *implement an Urgency, Safety and Other announcement to an individual station* 6. *implement an acknowledgment of a received individual call* 7. *implement an Urgency, Safety and Other group announcement* 8. *implement a polling and position request* 9. *implement an automatic/semi-automatic service with a coast station* |  |  |
| 6.2.5.10 Practical VHF tasks | R7 Table A-IV/2 col.1 |  |
| *The expected learning outcome is that the trainee is able to*   1. *transmit and receive information using VHF radio equipment and fulfilling the functional requirements of GMDSS* 2. *provide radio services in emergencies using VHF radio equipment* |  |  |
| **6.3 MF/HF-DSC** |  | A1 Sect.6.3 |
| 6.3.1 Basics |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the range of MF with the power of the transmitter* |  |  |
| 6.3.2 The use and functions of the MF/HF radio station installation | R19 | A2, A5 |
| *The expected learning outcome is that the trainee is able to*   1. *indicate the different parts of the MF/HF radio station* |  |  |
| 6.3.3 DSC possibilities | R18 |  |
| *The expected learning outcome is that the trainee is able to*   1. *quote the different class of MF/HF equipment* 2. *identify the possibilities of class A MF/HF equipment* |  |  |
| 6.3.4 Operational MF/HF DSC procedures in the GMDSS | R17 Ch.VII Art.30-33 | A2, A5 |
| 6.3.4.1 Telecommand and traffic information | R18, R19 |  |
| 6.3.4.2 Frequency selection in call format | R18, R19 |  |
| 6.3.4.3 Acknowledgement | R18, R19 |  |
| 6.3.4.4 Distress alert relay | R18, R19 |  |
| 6.3.4.5 Use of frequencies | R17 Ch.II, AP17 |  |
| 6.3.4.6 Test transmissions | R18, R19 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the operational MF/HF DSC procedures* |  |  |
| 6.3.5 Alerting and announcement | R19 | A2, A5 |
| 6.3.5.1 Distress alert | R17 Ch.VII Art.32, R19 |  |
| 6.3.5.2 Distress alert relay |  |  |
| 6.3.5.3 Announcement to individual station (Urgency, Safety and other) | R17 Ch.VII Art.33, R19 |  |
| 6.3.5.4 Geographic area announcement (Urgency and Safety) | R17 Ch.VII Art.33, R19 |  |
| 6.3.5.5 Group announcement (Urgency, Safety and other) | R17 Ch.VII Art.33, R19 |  |
| 6.3.5.6 Polling and position request | R18, R19 |  |
| 6.3.5.7 Automatic service with coast stations | R18, R19, R26 |  |
| 6.3.5.8 Automatic Connection System |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *implement a distress alert* 2. *implement a distress alert relay* 3. *implement an Urgency, Safety and Other announcement to an individual station* 4. *implement an Urgency and Safety geographic area announcement* 5. *implement an Urgency, Safety and Other group announcement* 6. *implement a polling and position request* 7. *implement an automatic service with a coast station* 8. *implement an MF/HF connection using ACS* |  |  |
| 6.3.5.9 Practical MF/HF tasks | R7 Table A-IV/2 col.1 |  |
| *The expected learning outcome is that the trainee is able to*   1. *transmit and receive information using MF/HF radio equipment and fulfilling the functional requirements of GMDSS* 2. *provide radio services in emergencies using MF/HF radio equipment* |  |  |
| **6.4 VHF/MF/HF voice procedure** | R4, R17 Ch.VII, Ch.IX Art.57 | A1 Sect.6.4, A2, A5 |
| 6.4.1 Distress procedure | R17 Ch.VII Art.32 |  |
| 6.4.1.1 Distress Relay | R17 Ch.VII Art.32 |  |
| 6.4.1.2 Acknowledgement | R17 Ch.VII Art.32 |  |
| 6.4.1.3 Distress Traffic and on-scene communication | R17 Ch.VII Art.32 |  |
| 6.4.1.4 Distress traffic finished | R17 Ch.VII Art.32 |  |
| 6.4.1.5 False Alert | R17 Ch.VII Art.32 |  |
| *The expected learning outcome is that the trainee is able to*   1. *perform a distress call* 2. *perform a distress relay on radiotelephony* 3. *perform an acknowledgement on radiotelephony* 4. *perform distress traffic and on-scene communication on radiotelephony* 5. *indicate the end of distress traffic on radiotelephony* 6. *cancel an inadvertent distress alert on radiotelephony* |  |  |
| 6.4.2 Urgency procedure | R17 Ch.VII Art.33 |  |
| 6.4.2.1 Urgency cancellation | R17 Ch.VII Art.33 |  |
| 6.4.2.2 Medical Transport | R17 Ch.VII Art.33 |  |
| *The expected learning outcome is that the trainee is able to*   1. *perform urgency communication on radiotelephony* 2. *cancel urgency communication on radiotelephony* 3. *perform medical* |  |  |
| 6.4.3 Safety procedure | R17 Ch.VII Art.33 |  |
| 6.4.3.1 Bridge-to-bridge communications | R24 |  |
| 6.4.3.2 Port operation and ship movement communications | R24 |  |
| 6.4.3.3 Use of other frequencies for safety communications | R24 |  |
| *The expected learning outcome is that the trainee is able to*   1. *perform safety communication on radiotelephony* |  |  |
| 6.4.4 General radiocommunications | R17 Ch.IX Art.57 |  |
| 6.4.4.1 Calling a subscriber (ship to shore) | R24 |  |
| 6.4.4.2 Phone call from ashore (shore to ship) | R24 |  |
| 6.4.4.3 Transmission of a telegram | R24 |  |
| 6.4.4.4 Ship-to-ship communication | R24 |  |
| *The expected learning outcome is that the trainee is able to*   1. *perform a call to a subscriber ashore using a coast station on radiotelephony* 2. *perform the reception of a phone call from ashore using a coast station on radiotelephony* 3. *perform the transmission of a telegram using a coast station on radiotelephony* 4. *perform ship-to-ship communication on radiotelephony* |  |  |
| 6.4.5 On board communication | R24 |  |
| *The expected learning outcome is that the trainee is able to*   1. *perform on-board communication on radiotelephony* |  |  |
| 6.4.6 Practical VHF/MF/HF voice tasks | R7 Table A-IV/2 col.1, col.2 |  |
| *The expected learning outcome is that the trainee is able to*   1. *transmit and receive information using VHF, MF, and HF radiotelephony* 2. *provide radio services in emergencies using VHF, MF and HF radiotelephony* |  |  |
| **6.5 Radiotelex** | R5, R21, R23 | A1 Sect.6.5, A2, A5 |
| 6.5.1 Basics | R21, R23 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the use of radiotelex* |  |  |
| 6.5.2 Numbering | R21, R23 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the different identification numbers to call a radiotelex station* 2. *identify the different method to use radiotelex* |  |  |
| 6.5.3 Radiotelex equipment | R21, R23 |  |
| *The expected learning outcome is that the trainee is able to*   1. *indicate the different parts of a Radiotelex terminal* |  |  |
| 6.5.4 Details of a telex message | R21, R23 |  |
| *The expected learning outcome is that the trainee is able to*   1. *read a telex message* |  |  |
| 6.5.5. Operational MF/HF radiotelex procedures in general radiocommunications | R23 |  |
| 6.5.5.1 Working with coast stations | R23 |  |
| 6.5.5.2 Working with ship stations | R23 |  |
| *The expected learning outcome is that the trainee is able to*   1. *send a telex to a subscriber ashore using Radiotelex with a coast station* 2. *communicate on Radiotelex with another ship* |  |  |
| 6.5.6 Practical MF/HF radiotelex tasks |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *communicate on radiotelex with a subscriber ashore and another ship* |  |  |
| **6.6 Recognized Mobile Satellite Services** | R1, R9 Ch.IV Reg.2.1.13 | A1 Sect.6.6, A2, A5 |
| 6.6.1 Inmarsat |  | T2 |
| 6.6.1.1 Inmarsat overview |  | T2 |
| 6.6.1.2 Inmarsat space segment |  | T2 |
| 6.6.1.3 Inmarsat ground segment |  | T2 |
| 6.6.1.4. Inmarsat Ship Earth Station |  | T2 |
| *The expected learning outcome is that the trainee is able to*   1. *describe the Inmarsat mobile satellite system* 2. *identify the Inmarsat SES for use in GMDSS* 3. *implement Distress, Urgency, Safety and Other communications with a GMDSS Inmarsat SES* |  |  |
| 6.6.2 Iridium |  | T3 |
| 6.6.2.1 Iridium overview |  | T3 |
| 6.6.2.2 Iridium space segment |  | T3 |
| 6.6.2.3 Iridium ground segment |  | T3 |
| 6.6.2.4 Iridium Ship Earth Station |  | T3 |
| *The expected learning outcome is that the trainee is able to*   1. *describe the Iridium mobile satellite system* 2. *identify the Iridium SES for use in GMDSS* 3. *implement Distress, Urgency, Safety and Other communications with a GMDSS Iridium SES* |  |  |
| 6.6.3 Practical SES tasks | R7 Table A-IV/2 col.1 |  |
| *The expected learning outcome is that the trainee is able to*   1. *transmit and receive information using RMSS SES and fulfilling the functional requirements of GMDSS* 2. *provide radio services in emergencies using RMSS SES* |  |  |
| **6.7 Cospas/Sarsat** | R1 | A1 Sect.6.7 |
| 6.7.1 The international Cospas-Sarsat Programme |  | A6 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the international Cospas-Sarsat Programme* |  |  |
| 6.7.2 Cospas/Sarsat space segment |  | A6 |
| 6.7.2.1 LEOSAR System |  | A6 |
| 6.7.2.2 GEOSAR System |  | A6 |
| 6.7.2.3 MEOSAR System |  | A6 |
| *The expected learning outcome is that the trainee is able to*   1. *describe Cospas-Sarsat space segment* |  |  |
| 6.7.3 Cospas/Sarsat ground segment |  | A6 |
| 6.7.3.1 LEOLUTs |  | A6 |
| 6.7.3.2 GEOLUTs |  | A6 |
| 6.7.3.3 MEOLUTs |  | A6 |
| 6.7.3.4 Mission Control Centres |  | A6 |
| *The expected learning outcome is that the trainee is able to*   1. *describe Cospas-Sarsat ground segment* |  |  |
| **6.8 Emergency Position Indicating Radio Beacon (EPIRB)** | R9 Ch.IV Reg.2.1.5 | A1 Sect.6.8 |
| 6.8.1 The basic operation of the Cospas-Sarsat satellite System  and signal routing/path | R17 Ch.VII Art.34, R22 | A4, A6 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the communication path of an EPIRB distress alert* |  |  |
| 6.8.2 Essential parts of Cospas-Sarsat EPIRBs |  | A4 |
| *The expected learning outcome is that the trainee is able to*   1. *identify the different parts of an EPIRB* |  |  |
| 6.8.3 The registration and coding of a 406 MHz EPIRB |  | A6 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the need to register any EPIRB* |  |  |
| 6.8.4 The information contents of a Distress alert |  | A6 |
| *The expected learning outcome is that the trainee is able to*   1. *quote the information contents of an EPIRB distress alert* |  |  |
| 6.8.5 EPIRB Operation |  | A4, A6 |
| *The expected learning outcome is that the trainee is able to*   1. *implement the operation of an EPIRB* |  |  |
| 6.8.6 The float-free function |  | A4, A6 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the float-free function of an EPIRB* 2. *clean and check EPIRB float-free mechanism* |  |  |
| 6.8.7 The correct use of the lanyard |  | A4, A6 |
| *The expected learning outcome is that the trainee is able to*   1. *remember the use of the lanyard of the EPIRB* |  |  |
| 6.8.8 EPIRB homing signal and locating capacity |  | A4, A6 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the homing signal of the EPIRB* 2. *understand the locating capacity of the EPIRB* |  |  |
| 6.8.9 Routine maintenance, testing requirements and test operation | R9 Ch.IV Reg.15 | T1 |
| *The expected learning outcome is that the trainee is able to*   1. *test an EPIRB* 2. *check EPIRB battery expiry date* |  |  |
| 6.8.10 Withdrawal of an unintended false Distress transmission | R8 |  |
| *The expected learning outcome is that the trainee is able to*   1. *cancel inadvertent EPIRB distress alert* |  |  |
| * + 1. Practical EPIRB tasks | R7 Table A-IV/2 col.1, col.2 |  |
| *The expected learning outcome is that the trainee is able to*   1. *transmit distress alert using Cospas-Sarsat EPIRB* |  |  |
| **6.9 Search and Rescue radar Transponder and AIS – Search and Rescue Transmitter** | R1 | A1 Sect.6.9 |
| 6.9.1 Different types of Search and Rescue radar SART  and AIS-SART and their operation |  | A4 |
| *The expected learning outcome is that the trainee is able to*   1. *compare the operation of radar SART and AIS-SART* |  |  |
| 6.9.1.1 Search and Rescue radar Transponder | R9 Ch.IV Reg.2.1.11 | A4 |
| *The expected learning outcome is that the trainee is able to*   1. *identify the radar SART indication on a radar screen* 2. *operate properly a radar SART* |  |  |
| 6.9.1.2 AIS - Search and Rescue Transmitter | R9 Ch.IV Reg.2.1.1 | A4 |
| *The expected learning outcome is that the trainee is able to*   1. *identify the AIS-SART indication on an AIS receiver or ECDIS display* 2. *operate properly an AIS-SART* |  |  |
| 6.9.2 Routine maintenance, testing requirements and test operation | R9 Ch.IV Reg.15 | T1 |
| *The expected learning outcome is that the trainee is able to*   1. *check battery expiry date of radar SART and AIS-SART* |  |  |
| 6.9.3 Practical radar SART/AIS-SART tasks | R7 Table A-IV/2 col.2 |  |
| *The expected learning outcome is that the trainee is able to*   1. *implement signal for locating by using radar SART and AIS-SART* |  |  |
| **6.10 Maritime Safety Information (MSI) and search and rescue related information** | R9 Ch.IV Reg.4.1.1.7 | A1 Sect.6.10 |
| 6.10.1 Basics | R1, R6 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the global organization of dissemination of MSI* 2. *understand SAR related information* 3. *identify radio equipment to receive MSI and SAR related information* |  |  |
| 6.10.2 NAVTEX | R1, R6, R11 | A1 Sect.6.10.2. |
| 6.10.2.1 NAVTEX frequencies | R17 AP 15, AP17 | A2 |
| *The expected learning outcome is that the trainee is able to*   1. *identify international NAVTEX frequencies* 2. *identify national NAVTEX frequencies* |  |  |
| 6.10.2.2 NAVTEX system | R1, R11 | A3 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the NAVTEX system* |  |  |
| 6.10.2.3 Responsibilities of a NAVTEX Co-ordinator | R11 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the role of the NAVTEX coordinator* |  |  |
| 6.10.2.4 Messages | R11 |  |
| *The expected learning outcome is that the trainee is able to*   1. *quote the 3 types of priority message used with NAVTEX* 2. *understand the generation of NAVTEX message* |  |  |
| 6.10.2.5 Operation of the NAVTEX receiver |  | A2, A5 |
| *The expected learning outcome is that the trainee is able to*   1. *identify the different parts of a NAVTEX receiver* 2. *identify the default setting of NAVTEX receiver* 3. *change paper of NAVTEX receiver* |  |  |
| 6.10.2.6 Selection of transmitters, message type | R15 | T4 |
| *The expected learning outcome is that the trainee is able to*   1. *select a NAVTEX coast station on the NAVTEX receiver* |  |  |
| 6.10.2.7 Practical NAVTEX tasks | R7 Table A-IV/2 col.1, R11 | A2, A5 |
| *The expected learning outcome is that the trainee is able to*   1. *receive MSI and SAR related information using NAVTEX receiver* |  |  |
| 6.10.3 EGC | R1, R6 | A1 Sect.6.10.3 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the international EGC service* |  |  |
| 6.10.3.1 SafetyNET | R6, R12 | A1 Sect.6.10.3.1 |
| *The expected learning outcome is that the trainee is able to*   1. *describe the SafetyNET service* |  |  |
| 6.10.3.2 SafetyCast | R6, R13 | A1 Sect.6.10.3.2 |
| *The expected learning outcome is that the trainee is able to*   1. *describe the SaftyCast system* |  |  |
| 6.10.3.3 Practical tasks for reception of MSI and  SAR related information via EGC | R7 Table A-IV/2 col.1, R12, R13 |  |
| *The expected learning outcome is that the trainee is able to*   1. *receive MSI and SAR related information using EGC receiver* 2. *identify the RMSS and type of EGC receiver associated* 3. *Set up the EGC receiver* 4. *Select different NAVAREAs, METAREAs and Coastal warning areas* |  |  |
| 6.10.4 MSI and SAR related information via HF NBDP | R17 AP17, R6, R15 | A1 Sect.6.10.4, T4 |
| *The expected learning outcome is that the trainee is able to*   1. *Identify the HF coast stations broadcasting MSI and SAR related information* |  |  |
| 6.10.4.1 Practical tasks for reception of MSI and  SAR related information via HF NBDP | R7 Table A-IV/2 col.1, R6, R15 |  |
| *The expected learning outcome is that the trainee is able to*   1. *receive MSI and SAR related information using HF NBDP receiver* |  |  |
| **6.11 The use and functions of portable two-way VHF radiotelephone apparatus** | R9 Ch.IV Reg.7.2, 7.3, 7.4 | A1 Sect.6.11, A4 |
| 6.11.1 Practical tasks for portable two-way VHF radiotelephone apparatus | R7 Table A-IV/2 col.1, col.2 |  |
| *The expected learning outcome is that the trainee is able to*   1. *transmit and receive information using two-way VHF radiotelephone apparatus* 2. *provide radio services in emergency using portable two-way VHF radiotelephone apparatus* |  |  |
| **6.12 On-scene (aeronautical) portable two-way VHF radiotelephone apparatus** | R9 Ch.IV Reg.7.6 | A1 Sect.6.12, A4 |
| 6.12.1 Practical tasks for on-scene (aeronautical) portable two-way VHF radiotelephone apparatus | R7 Table A-IV/2 col.1, col.2 |  |
| *The expected learning outcome is that the trainee is able to*   1. *transmit and receive information using on-scene (aeronautical) portable two-way VHF radiotelephone apparatus* 2. *provide radio services in emergency using on-scene (aeronautical) portable two-way VHF radiotelephone apparatus* |  |  |
| **7. Other systems used on board** |  | A1 Sect.7 |
| **7.1 Ultra High Frequency (UHF) handhelds** |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the use of UHF handhelds* |  |  |
| **7.2 Automatic Identification System** | R9 Ch.V Reg.19 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the use of AIS* |  |  |
| **7.3 Ship Security Alert System** | R9 Ch XI-2 Reg.6 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the SSAS* 2. *identify possible common system for GMDSS and SSAS* |  |  |
| **8. Search and Rescue operation** | R2, R3 | A1 Sect.8 |
| **8.1 Search and rescue as a system** | R3 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the SAR system* |  |  |
| **8.2 The role of Rescue Co-ordination Centres (RCC)** | R3 |  |
| 8.2.1 Maritime rescue organisations | R3 |  |
| 8.2.2 Knowledge of SAR systems worldwide | R3 | T4 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the role of RCC* 2. *understand the global SAR system* |  |  |
| **8.3 Shore-based SAR communication network and operation** | R6 | T4 |
| *The expected learning outcome is that the trainee is able to*   1. *understand the routeing of distress alert by any GMDSS subsystem* 2. *identify RCC coast stations in the GMDSS master plan* |  |  |
| **8.4 International Aeronautical and Maritime Search**  **and Rescue (IAMSAR) Manual** | R3 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify the 3 volumes of IAMSAR manual* |  |  |
| **9. The role and method of use of ship reporting systems** | R2 Ch.5, R7 Table A-IV/2 col.2 | A1 Sect.9 |
| **9.1 Automated Mutual-assistance Vessel Rescue System** |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the AMVER system* |  |  |
| **9.2 Japanese Ship Reporting System** |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the JASREP system* |  |  |
| **9.3 Modernized Australian Ship Tracking and Reporting System** |  |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the MASTREP system* |  |  |
| **9.4 Long Range Identification and Tracking of Ships (LRIT)** | R9 Ch.V Reg.19-1 |  |
| *The expected learning outcome is that the trainee is able to*   1. *understand the LRIT system* |  |  |
| **10. Miscellaneous skills and operational procedures for  general radiocommunications** |  | A1 Sect.10 |
| **10.1 Use of English in written and oral form for radiocommunications** | R7 Table A-IV/2 col.2 | A1 Sect.10.1 |
| 10.1.1 Use of the IMO Standard Marine Communication Phrases | R7 Table A-IV/2 col.1, col.2, R4 |  |
| 10.1.2 Use of the International Code of Signals | R7 Table A-IV/2 col.1, col.2, R5 |  |
| 10.1.3 Miscellaneous abbreviations and signals to be used for radiocommunications in the maritime mobile service (Q-Code) | R25 |  |
| 10.1.4 Use of the International Phonetic Alphabet | R17 AP 14 |  |
| *The expected learning outcome is that the trainee is able to*   1. *communicate in English* 2. *use SMCP* 3. *use the international Code of Signals* 4. *use the International Phonetic Alphabet* |  |  |
| **10.2 Procedure of traffic charging** | R17 Art.58, R27 | A1 Sect.10.2 |
| 10.2.1 The international charging and accounting system | R17 Art.58, R27 |  |
| 10.2.2 The AAIC code and its use | R27 |  |
| 10.2.3 Coast station-, landline and ship station charge | R15 | T4 |
| 10.2.4 Currencies used for the account of international radiocommunications | R27 |  |
| 10.2.5 Satellite communication charging systems | R27 |  |
| *The expected learning outcome is that the trainee is able to*   1. *identify billing system for general radiocommunications* |  |  |

# PART D: Instructor Manual

* General

This manual reflects the view of independent consultants on methodology and organization of the work and is based on their own experience as instructor. The instructors should use this manual as guidance initially but should work out their own ideas and methods, based on the experience gained and tailored to suit the various backgrounds of the students.

This manual contains guidance on the teaching methods that are considered to be the most appropriate to the subject matter. However, since circumstances vary, the instructors must decide upon the best methods to adopt in order for the students to attain the specified objectives.

* Use the teaching aids, IMO/ITU references, etc.

The compendium accompanying this course contains text covering some subjects, which are not adequately covered in the other course material. When using this compendium, the instructors should take into account the students’ prior knowledge of these subjects. Note that the students are training to become operators of radio-communication equipment and not technicians or engineers.

The instructor may choose to use books if deemed suitable for this purpose. There are also many other books covering the GMDSS, or maritime radiocommunications in general, available throughout the world. A number of videos and CD's are also available. The instructor has to make sure, that the additional books used for training contain the correct information.

It is important that the instructor makes use of official publications wherever possible, especially those which are required to be carried on board ships. This will serve to familiarize the students with this information. Nevertheless, national publications should also be taken into account.

Note that this compendium contains information of a general nature; when lecturing on technical subjects, the instructor should make use of the technical manuals covering the actual equipment provided for the course. Advantage should also be taken of the information that is provided in the relevant publications listed under Texbooks (T).

* Lesson plans

When choosing the most appropriate teaching method, it will be necessary to draw up some form of plan. The purpose of a lesson plan is to create the structure for the lessons, which can be adjusted according to the circumstances. Without such a plan there is a risk of the lesson becoming disorganized and ineffective.

The process of producing a lesson plan is also very important as it focuses the instructor's attention on every detail of the course.

The time allocated to each component of the lesson is important, particularly on short courses where there is little opportunity to compensate for lost time. It is essential that all elements of a lesson be given a reasonable proportion of the available time. Failure to do this would result in the neglect of certain subjects.

Other forms of lesson planning may be equally suitable, but whatever the style, the important fact is that planning and preparation are essential to good teaching.

* Use of personal computers (PCs)

More and more use of software based GMDSS simulation will take place in the training of students, especially with regard to DSC and GMDSS satellite systems operations. It is very important to make sure that the students are familiar with this kind of equipment. The software simulation should also cover general radiocommunications as it is part of the maritime radiocommunications and is often performed using the same radio equipment for GMDSS.

Where PCs are used for simulating[[1]](#footnote-1) communication exercises in this course, their use should be made as simple and easy as possible. The PCs should be in a network to handle the different equipment as realistic as possible. The software shall simulate the equipment as realistically as possible in all situations.

Unless an enhanced course, which also includes general use of PCs, is being conducted, the instructor should avoid using precious time on purely PC-related matters.

* False Distress Alert

The generation and emission of false distress alerts must be avoided and every precaution possible must be taken in order to achieve this. This means that the students must understand the very serious consequences of generating and emitting false distress alerts and be instructed on how to avoid such incidents and on the action, they should take if they inadvertently transmit such an alert.

False distress alerts may lead to a loss of faith in the communication system used, and in the GMDSS as a concept, especially within the Search and Rescue Community. They may also lead to a serious waste of resources, both economical and human.

In view of the fact that the students are to become professionals, i.e. the persons who will, as a part of their shipboard duties (ref. SOLAS Ch. IV, Regulation 12), be responsible for the operation of the communication equipment, therefore the instructor must impress upon them the importance of thinking before using this equipment, especially regarding DSC, EPIRB and SESs.

The instructor must also make sure that the students understand the possible danger of false distress alerts being initiated by other members of the crew, especially those who are able to gain access to equipment though lack of necessary authorization or familiarity with the equipment that is needed to prevent improper operation. Measures need to be ensured that whenever anybody on board, not in possession of a relevant certificate, may be allowed to use GMDSS equipment for commercial purposes, this person must be instructed properly and must also be supervised by a responsible operator. As a general rule, all GMDSS training must be supervised by the Instructor while giving training on real equipment, this to avoid unintentional alarms.

Another problem area is the testing of equipment, especially the testing of EPIRBs, radar SARTs and AIS-SARTs. These types of equipment should only be tested by qualified personnel, and preferably only in connection with the annual radio survey and in accordance with the prescribed testing procedures (ref. SOLAS Ch. IV, Reg. 15.9 and guidelines given in MSC.1/Circ.1040/Rev.2).

Furthermore, a problem may arise during the installation and servicing of the GMDSS equipment. A responsible operator should supervise this work and should ensure that the technician knows about the risk of emission of false distress alerts that exists unless caution is shown. Procedures to advise RCCs of the transmission of false distress alerts have been established by IMO. It is necessary for the instructors to gain familiarization with the content of IMO Resolution MSC. 514 (105) – Guidelines for the Avoidance of False Distress Alerts and ITU-R Resolution 349 (REV.WRC-19) - Operational procedures for cancelling false distress alerts in the GMDSS.

* Search and Rescue matters

When instructing qualified deck officers or students undergoing training in the deck department, the instructor should take advantage of this fact and use whatever navigational training equipment is available. For instance, a radar simulator, an ARPA simulator and/or a full mission bridge simulator, or realistic GMDSS simulators could be an extremely valuable tool for training in SAR communications. If such equipment is available, the instructor should co-operate with other relevant instructors in order to provide as realistic training as possible.

* English language

The STCW Code requires that any seafarer whose duties include communications shall have a sufficient knowledge of the English language. The Radio Regulations recommend the use of IMO Standard Marine Communication Phrases and, where language difficulties exist, the International Code of Signals should be available for exercises.

A general knowledge of the English language is therefore to be expected from the students. The instructor will have to make sure that the students can actually use maritime English for communication purposes. This is extremely necessary for Distress, Urgency and Safety communications.

With regard to the spoken language, the instructor should conduct the majority of the theoretical and practical training sessions using the English language and require the students to reply to any questions, and to put their own questions and comments, using the English language.

* Examination

The trainees who successfully complete the training course should be able to demonstrate their competence, including to efficiently operate the GMDSS equipment required to be fitted on ships navigating in sea areas A1, A2, A3 or A4 and to have primary responsibility to undertake radio communications during distress-, urgency-, safety incidents and for general radiocommunication purposes.

On all theoretical subjects, the examination should be conducted as a combination of written, practical as well as oral tests. The practical test in combination with the voice procedure can be performed on real equipment which is connected together (VHF, MF/HF) or on PC-based simulation which simulates the equipment as well as the radio conditions and carry out all relevant and necessary general radiocommunications using radiotelephony, NBDP and DSC.

On all practical subjects, the examination should include a combination of oral tests and practical demonstrations (ref. STCW Code, Section A-IV/2).

A part of the written and oral tests should be conducted in English in order to ensure that the student, as a minimum, is able to:

* read and understand written distress, urgency and safety messages received via the recognized mobile satellite services (e.g. Inmarsat and Iridium);
* compose written distress, urgency and safety messages for transmission via the recognized mobile satellite services (e.g. Inmarsat and Iridium);
* conduct distress traffic and participate actively in SAR-communications via radiotelephony;
* read and understand the information given in all relevant service documents, including relevant parts of the technical documentation; and
* carry out all relevant and necessary general radiocommunications using radiotelephony, NBDP and DSC.

The practical tests should be carried out on real equipment or/and on the above-mentioned PC-based simulation. The student must be able to (see example of trainee's proficiency checklist on use of GMDSS):

* handle all relevant maritime radio equipment (VHF-DSC, MF/HF-DSC, NBDP, Inmarsat and Iridium GMDSS satellite systems, NAVTEX, EPIRB, radar SART, AIS-SART, etc.)
* show all communication types (Voice, Telex, DSC etc.) in combination with the operation of the corresponding facilities
* perform traffic in all kinds of priorities (Distress, Urgent, Safety, Other)

# Part E: Evaluation

**■ Introduction**

The effectiveness of any evaluation depends to a large extent on the precision of the description of what is to be evaluated. Generally, in order to select the proper assessment methods and measures, instructors should first be aware of the expected learning outcomes in terms of the scope of knowledge, understanding and proficiency required.

Thus, to assist instructors, the detailed outline uses descriptive verbs for the specific learning outcomes, mostly taken from the widely used revised Bloom’s taxonomy. These learning outcomes provide a sound basis for the construction of suitable tests for evaluation trainee progress.

Evaluation/assessment is a way of finding out if learning has taken place. It enables the assessor to ascertain if the trainees have gained the required skills and knowledge needed to effectively demonstrate their competence to perform the duties at a given point in a course or towards qualification.

**■ Assessment**

In assessing the achievement of competences and requirements in table A-IV/2 of the STCW Code and the Radio Regulations, assessors should be guided by the criteria for evaluating competences in column 4 of table A-IV/2 of the STCW Code and the learning outcomes in Detailed outline.

The purpose of evaluation/assessment is to:

.1 assist trainee learning;

.2 identify trainees' strengths and weaknesses;

.3 assess the effectiveness of an instructional strategy;

.4 assess and improve the effectiveness of curriculum programmes; and

.5 assess and improve teaching effectiveness.

**■ Validity**

The evaluation methods should be based on clearly defined objectives, and truly represent what is meant to be assessed, for example the relevant criteria and the specific learning outcomes of the course. There should be a reasonable balance between the subject topics involved and also in the testing of trainees' Knowledge, Understanding of the concepts and Proficiency in their application. To be reliable, an evaluation procedure should produce reasonably consistent results no matter which set of papers or version of the test is used.

**■ Evaluation of competence**

Methods for demonstrating competence in column 3 and criteria for evaluating competence in column 4 of table A-IV/2 of the STCW Code set out the methods and criteria for evaluation. Instructors should refer to this table when designing the assessment.

It is essential that the trainees are assessed during the exercises to evaluate whether they have achieved the required level of competence or are found to be "not competent".

Instructors and assessors should be guided by the following IMO model courses providing detailed guidance and information for the effective and reliable evaluation and assessment:

.1 1.30 on Onboard Assessment;

.2 3.12 on Assessment, Examination and Certification of Seafarers;

.3 6.09 on Training Course for Instructors; and

.4 6.10 on Train the Simulator.

* Reliability

Assessment should also be reliable (if the assessment was done again with a similar group/learner, would similar results be achieved). Different groups of learners may have the same subject at different times. If other assessors are also assessing the same course/qualification, there is a need to ensure all are making the same decisions. To be reliable an evaluation procedure should produce reasonably consistent results, no matter which set of papers or version of the test is used. If instructors are assessing their own trainees, they need to know what they are to assess and then decide how to do this. The "what" will come from the standards/learning outcomes of the course/qualification they are delivering and the "how" may already be decided for them if it is in assignments, tests or examinations.

The instructors need to consider the best way to assess the skills, knowledge and attitudes of their learners, whether this will be formative and/or summative and the validity and reliability of the assessment.

All work assessed should be valid, authentic, current, sufficient and reliable; this is often known as VACSR – "valid assessments create standard results":

* valid – the work is relevant to the standards/criteria being assessed;
* authentic – the work has been produced solely by the learner;
* current – the work is still relevant at the time of assessment;
* sufficient – the work covers all the standards/criteria;
* reliable – the work is consistent across all learners, over time and at the required level.

It is important to note that no single method can satisfactorily measure knowledge and skill over the entire spectrum of matters to be tested for the assessment of competence.

Care should therefore be taken to select the method most appropriate to the particular aspect of competence to be tested, bearing in mind the need to frame questions which relate as realistically as possible to the requirements of the officer's tasks at sea.

* Compiling assessments

Whilst each examining authority establishes its own rules, the length of time which can be devoted to assessing the competence of candidates for certificates of competency is limited by practical, economic and social restraints. Therefore, a prime objective of those responsible for the organization and administration of the assessment system is to find the most efficient, effective and economical method of assessing the competency of candidates. An examination system should effectively test the breadth of a candidate's KNOWLEDGE, UNDERSTANDING AND PROFICIENCY of the subject areas pertinent to the tasks he is expected to undertake. It is not possible to examine candidates fully in all areas, so in effect the assessment samples a candidate's KNOWLEDGE, UNDERSTANDING AND PROFICIENCY by covering as wide a scope as is possible within the time constraints and testing his depth of KNOWLEDGE, UNDERSTANDING AND PROFICIENCY in selected areas.

The assessment as a whole should assess each candidate's comprehension of principles, concepts and methodology; ability to apply principles, concepts and methodology; ability to organize facts, ideas and arguments and abilities and skills in carrying out the tasks to perform in the duties he or she is to be certificated to undertake.

All evaluation and testing techniques have their advantages and disadvantages. An examining authority should carefully analyze precisely what it should be testing and can test. A careful selection of test and evaluation methods should then be made to ensure that the best of the variety of techniques available today is used. Each assessment shall be that best suited to the learning outcome or ability to be assessed.

* Quality of test items

No matter which type of test is used, it is essential that all questions or test items used should be as brief as possible, since the time taken to read the questions themselves lengthens the examination. Questions must also be clear and complete. To ensure this, it is necessary that they be reviewed by a person other than the originator. No extraneous information should be incorporated into questions.

* Examination guideline

The efficient operation of GMDSS depends on the proficiency of the maritime radio operators. The examination should consist of a theoretical and practical part.

* A: Theoretical Examination

The theoretical examination should consist of multiple-choice questionnaires and a questionnaire in which the applicants can answer the questions without any choices given.

Every training post should have a pool of approximately 250 to 300 questions spread over the complete field of the section A1 to A6.

**A1**: Basic knowledge of the GMDSS

* Different components of the GMDSS
* Construction of the GMDSS
* Sea areas
* Carriage requirements
* Knowledge of the regulations and agreements in the maritime mobile service (Radio Regulations, SOLAS, STCW Code Table A-IV/2, etc.) including mitigation of false distress alerts, and procedures to be followed after transmitting a false distress alert
* Regulations concerning documentation
* Preservation of the secrecy of correspondence

**A2**: Types of communication in the maritime mobile service

* Distress, Urgency and Safety communication
* General communication
* Port operation service
* Ship movement service
* Ship-to-Ship communication
* On board communication

**A3**: Types of station in the maritime mobile service

* Ship stations
* Ship Earth stations
* Coast stations
* Coast Earth stations
* Pilot stations, port stations etc.
* Aircraft stations
* Rescue Coordination Centre (RCC)

**A4**: Elementary knowledge of radio frequencies and frequency bands

* Frequency and wavelength
* The units of frequencies: Hz, kHz, MHz, GHz.
* The subdivision of the most significant part of the radio
* Spectrum: MF, HF, VHF, UHF, SHF
* Different propagation mechanisms and typical ranges
* Propagation on MF frequencies
* Propagation on different HF frequency bands
* Propagation on VHF and UHF frequencies

**A5**: Frequencies allocated to the maritime mobile service

* The usage of LF, MF, HF, VHF, UHF and SHF frequencies in the maritime mobile service
* Modes of communication (Radiotelephony, NBDP, Facsimile, Email, Data, DSC)
* Classes of emission
* Bandwidth of different emissions, carrier frequency and assigned frequency
* Official designations of emission
* Unofficial designations of emissions (e.g. TLX, SSB, AM, FM)
* The concept of radio channel: simplex, semi-duplex and duplex; paired and unpaired channels and frequencies.
* Channeling systems in the VHF, MF and HF maritime mobile bands, including allocations for the GMDSS.
* Distress, Urgency and Safety frequencies
* Ship-to-ship communications frequencies
* Port operations frequencies
* Ship movement frequencies
* Calling frequencies

**A6**: Maintaining the functionality of a ship station

* Sources of energy of ship stations
* Batteries
* Different kinds of batteries and their characteristics
* Charging
* Maintenance of batteries
* Antenna maintenance
* Functional tests
* Preventive measures for the safety of the ship and personnel in connection with hazards related to radio equipment, including electrical and non-ionizing radiation hazards
* In an abandon ship situation
* In case of fire on board ship
* In case of partial or full breakdown of radio installation
* B: Practical Examination

In the practical examination several applicants can prove their knowledge at the same time depending on the technical equipment. For each applicant a protocol as shown in Annex I should be used.

To conduct GMDSS communications (Distress, Urgency and Safety) and General radiocommunications in English language by means of case examples, real radio devices on dummy loads communicating with each other or on approved networked GMDSS simulation equipment which meets all applicable performance standards set out in Regulation I/12 of the STCW-Convention, should be used.

**B1**: Detailed practical knowledge and ability to use radio equipment (see Annex 1)

**B2**: Detailed practical knowledge on GMDSS (Distress, Urgency and Safety) and General radiocommunication procedures in radiotelephony, radiotelex and via satellite systems

* Distress communication
  + Alert, call and message
  + Distress traffic with ship stations, coast stations and aircraft stations
  + Cessation of distress traffic
  + Withdrawing of a false distress alert
* Urgent communication
  + Announcement, call and message
  + Urgency traffic with ship stations, coast stations and aircraft stations
  + Cessation urgency traffic
* Safety communication
  + Announcement, call and message
  + Safety traffic with ship stations, coast stations and aircraft stations
  + Cessation safety traffic
* Other communication (General radiocommunications)
  + Ship station to Ship station
  + Ship station to Coast station or/and subscriber
  + Ship earth station to ship earth station
  + Ship earth station to coast earth station or land subscriber

**B3**: Ability of using Handbooks and ITU Lists

* List of Coast Stations and Special Service Stations (List IV)
* List of Ship Stations and Maritime Mobile Service Identity Assignments (List V)
* Handbook for the use by the Maritime Mobile and Maritime Mobile Satellite Services (Maritime Manual)
* RMSS providers user manuals
* Nautical publications (e.g. Admiralty List of Radio Signals (Vol I, Vol III, Vol V, Vol VI))

# Appendix 1 – Implementation of IMO courses

This Appendix provides instructors additional information that can be used in the final course development and approval process.

# **Annex 1: Example of trainee's practical proficiency checklist**

|  |  |  |  |
| --- | --- | --- | --- |
| **VHF** | |  | |
| **Transmit capabilities** | |  | |
| DSC distress alert without nature of distress | |  | |
| DSC distress alert with nature of distress | |  | |
| DSC distress alert relay to all stations | |  | |
| DSC distress alert relay to an individual coast station | |  | |
| DSC all stations urgency announcement with working channel | |  | |
| DSC ship to ship urgency announcement with working channel | |  | |
| DSC ship to coast station urgency announcement | |  | |
| DSC all stations safety announcement with working channel | |  | |
| DSC ship to ship safety announcement with working channel | |  | |
| DSC ship to coast station safety announcement | |  | |
| DSC ship to ship other announcement with working channel | |  | |
| DSC group announcement (urgency, safety, other) with working channel | |  | |
| DSC geographic area announcement (urgency, safety, other) with working channel | |  | |
| DSC polling | |  | |
| DSC position request | |  | |
| DSC medical transport and neutral ships and aircraft | |  | |
| **Other capabilities** | |  | |
| Establish operational readiness (ch16, 25W, International channel selection) | |  | |
| Select DSC received messages out of memory (distress + non-distress) | |  | |
| Select MMSI numbers | |  | |
| Implement coast stations | |  | |
| Implement subscriber | |  | |
| Implement position and time (if no GNSS is available) | |  | |
| Change DSC auto acknowledgement settings | |  | |
| Change channel | |  | |
| Change power settings | |  | |
| Switch between International channels an US channels | |  | |
| Switch on and off the dual watch function | |  | |
| Edit the address book | |  | |
| Carry out the implemented test routine | |  | |
| Operate the Volume and Squelch | |  | |
| **MF/HF** |  | |
| **Transmit capabilities** |  | |
| DSC distress alert without nature of distress |  | |
| DSC distress alert with nature of distress |  | |
| DSC distress alert relay to all stations |  | |
| DSC distress alert relay to geographic area |  | |
| DSC distress alert relay to an individual coast station |  | |
| DSC all stations urgency announcement with working frequency |  | |
| DSC ship to ship urgency announcement with working frequency |  | |
| DSC ship to coast station urgency announcement |  | |
| DSC all stations safety announcement with working frequency |  | |
| DSC ship to ship safety announcement with working frequency |  | |
| DSC ship to coast station safety announcement |  | |
| DSC ship to ship other announcement with working frequency |  | |
| DSC group announcement (urgency, safety, other) with working frequency |  | |
| DSC geographic area announcement (urgency, safety, other) with working frequency |  | |
| DSC polling |  | |
| DSC position request |  | |
| DSC medical transport and neutral ships and aircraft |  | |
|  |  | |
| **Other capabilities** |  | |
| Establish operational readiness (TX/RX 2182 kHz, full Power, SSB, DSC watch) |  | |
| Select DSC received messages out of memory (distress + non-distress) |  | |
| Select MMSI numbers |  | |
| Implement coast stations |  | |
| Implement subscriber |  | |
| Implement position and time (if no GNSS is available) |  | |
| Implement new coast station frequencies |  | |
| Change DSC auto acknowledgement settings |  | |
| Change frequencies (TX and RX) for communication |  | |
| Change power settings |  | |
| Change kind of modulation |  | |
| Operate the Volume and Squelch |  | |
| Operate the Tuning |  | |
| Operate the Clarifier |  | |
| Operate the RF-Gain |  | |
| Switch to Automatic Gain Control |  | |
| Switch between International frequency and channels |  | |
| Switch on and off the DSC watch function |  | |
| Add new coast stations |  | |
| Edit the paired channel list (Communication with coast stations) |  | |
| Change routine DSC watch frequencies |  | |
| Carry out the implemented test routine |  | |
| Edit the address book |  | |
|  |  | |
| **INMARSAT Fleet Safety** |  | |
| **Transmit capabilities** |  | |
| Sending distress alert, call and message |  | |
| Sending urgency or safety calls using 2-digit access codes by telephony |  | |
| Sending a distress alert relay to an RCC |  | |
| Performing other communications with a land subscriber by telephony |  | |
| Performing other communications with a ship by telephony |  | |
| Testing the distress facility |  | |
| Sending urgency or safety messages using 2-digit access codes |  | |
| Transmitting an email, with priority level "other", to a land subscriber |  | |
| Transmitting an email, with priority level "other", to a ship |  | |
|  |  | |
| **Receipt capabilities** **of MSI or SAR related message** |  | |
| Set up the EGC receiver |  | |
| Select NAVAREA/METAREA or Coastal warning area |  | |
| Select received message |  | |
| Read EGC from logs folder |  | |
|  |  | |
| **Other capabilities for general radiocommunications** |  | |
| Edit the configuration |  | |
| Edit the address book |  | |
| Compose a correct email to a ship or a land subscriber |  | |
| Save the email in a correct folder |  | |
| Open a message out of the correct folder |  | |
| Read the receive logs |  | |
| Use the help function |  | |
| Establish operational readiness |  | |
|  |  | |
| **INMARSAT-C** |  | |
| **Transmit capabilities** |  | |
| Sending distress alert without nature of distress |  | |
| Sending distress alert with nature of distress |  | |
| Sending distress message with nature and details of distress |  | |
| Sending urgency or safety messages using access codes by telex |  | |
| Transmitting a telex/facsimile/e-mail, with priority level "other", to a land subscriber |  | |
| Transmitting a telex, with priority level "other", to a ship |  | |
| Login and logout procedure |  | |
| Change the satellite |  | |
|  |  | |
| **Receipt capabilities** **of MSI or SAR related message** |  | |
| Set up the EGC receiver |  | |
| Select NAVAREA/METAREA or Coastal warning area |  | |
| Select received message |  | |
| Read EGC from logs folder |  | |
|  |  | |
| **Other capabilities** |  | |
| Edit the default settings (configuration, routing, etc.) |  | |
| Perform a link test |  | |
| Configure and carry out a data reporting |  | |
| Edit the address book |  | |
| Compose a correct telex/facsimile/email to a ship or a land subscriber |  | |
| Save the telex in a correct folder |  | |
| Open a message out of the correct folder |  | |
| Read the receive logs |  | |
| Use the help function |  | |
| Establish operational readiness (Transceiver on, Printer on, Screen on) |  | |
|  |  | |
| **Iridium GMDSS Terminal** |  | |
| **Transmit capabilities** |  | |
| Sending distress alert, call and message |  | |
| Making urgency or safety calls using 2-digit access codes by telephony |  | |
| Sending a distress relay to an RCC |  | |
| Select and send a “safety message” with priority level Distress to an RCC |  | |
| Select and send a “safety message” with priority level Urgency to an RCC |  | |
| Select and send a “safety message” with priority level Safety to an RCC |  | |
| Calling a land subscriber, with priority level "other", by telephony |  | |
| Calling a ship, with priority level "other", by telephony |  | |
| Transmit an SMS and email, with priority level "other", to a land subscriber |  | |
|  |  | |
| **Receipt capabilities** **of MSI or SAR related message** |  | |
| Set up the EGC receiver |  | |
| Select NAVAREA/METAREA or Coastal warning area |  | |
| Select received message |  | |
| Read EGC from logs folder |  | |
|  |  | |
| **Other capabilities SMS and email** |  | |
| Edit the configuration |  | |
| Edit the address book |  | |
| Compose a correct SMS and email to a ship or a land subscriber |  | |
| Save the SMS or email in a correct folder |  | |
| Open a SMS or email out of the correct folder |  | |
| Read the receive logs |  | |
| Use the help function |  | |
|  |  | |
| **NAVTEX** |  | |
| Select receive station |  | |
| Select receive message |  | |
| Select receive frequency |  | |
| Read message from receive memory |  | |
| Changing the default settings (display, print, etc.) |  | |
|  |  | |
| **EPIRB** |  | |
| Putting the EPIRB out of bracket |  | |
| Testing the EPIRB |  | |
| Switch the EPIRB to alarm mode |  | |
| Switch off the EPIRB |  | |
|  |  | |
| **Radar SART / AIS-SART** |  | |
| Putting the radar SART / AIS-SART out of bracket |  | |
| Testing the radar SART / AIS-SART |  | |
| Switch on the radar SART / AIS-SART |  | |
| Switch off the radar SART / AIS-SART |  | |
|  |  | |
| **PORTABLE TWO-WAY VHF RADIOTELEPHONE APPARATUS** |  | |
| Change channel |  | |
| Change power settings |  | |
| Switch between International channels and US channels |  | |
| Switch on and off the dual watch function |  | |
| Operate Volume and Squelch control |  | |
| Change Battery |  | |
|  |  | |
| **ON-SCENE (AERONAUTICAL) PORTABLE TWO-WAY VHF RADIOTELEPHONE APPARATUS** |  | |
| Change channel |  | |
| Change power settings |  | |
| Operate Volume and Squelch control |  | |
| Change Battery |  | |
|  |  | |

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Annex 2: Practical Examination Protocol GOC

**I Compulsory Tasks - Terrestrial Maritime Mobile Service - MF/HF-DSC and radiotelephony**

Conducting GMDSS Distress, Urgency and Safety radio traffic in English language by means of case examples on two MF/HF-DSC radio devices communicating with each other or with approved networked radio simulation equipment.

|  |  |  |  |
| --- | --- | --- | --- |
| **Examinee 1** | | **Examinee 2** | |
| Editing DSC distress alert and transmitting distress message in radio telephony | 1.Attempt  2.Attempt | Reading out memory and acknowledging receipt of distress message | 1.Attempt  2.Attempt |
| Imposing silence | 1.Attempt  2.Attempt | Editing DSC distress alert relay and transmit it to a coast station | 1.Attempt  2.Attempt |
| Conducting distress traffic | 1.Attempt  2.Attempt | Conducting distress traffic | 1.Attempt  2.Attempt |
| Cease distress traffic | 1.Attempt  2.Attempt | Cancelling of a false distress alert (DSC and radio telephony) | 1.Attempt  2.Attempt |
| DSC urgency announcement and transmitting an urgency message | 1.Attempt  2.Attempt | Record of an urgency message and initiation of further measures | 1.Attempt  2.Attempt |
| Record of a safety message and initiation of further measures | 1.Attempt  2.Attempt1 | DSC safety announcement and transmitting a safety message | 1.Attempt  2.Attempt |
| Relay of a received distress alert to a coast station by Radio-telex (ARQ) | 1.Attempt  2.Attempt | Editing DSC distress alert and initiation of distress traffic by means of radio telex (FEC) | 1.Attempt  2.Attempt |

**II Compulsory Tasks – Maritime Mobile Satellite Service - Inmarsat Fleet Safety**

Conducting GMDSS Distress, Urgency Safety and Routine traffic in English language by means of case examples on an approved networked radio simulation equipment or functional dummy loaded Inmarsat Fleet Safety device.

|  |  |  |  |
| --- | --- | --- | --- |
| **Examinee 1** | | **Examinee 2** | |
| Set type of EGC message | 1.Attempt  2.Attempt | Set type of EGC receiving area | 1.Attempt  2.Attempt |
| Release a distress alert and transmit the distress message by telephony | 1.Attempt  2.Attempt | Release a distress alert and transmit the distress message | 1.Attempt  2.Attempt |
| Conducting distress traffic | 1.Attempt  2.Attempt | Conducting distress traffic | 1.Attempt  2.Attempt |
| Request medical advice by means of 2-digit access codes | 1.Attempt  2.Attempt | Request medical advice by means of 2-digit access codes via telephony | 1.Attempt  2.Attempt |
| Transmitting of a safety message to a land subscriber | 1.Attempt  2.Attempt | Transmitting of a safety message to a ship earth station | 1.Attempt  2.Attempt |
| Initiating a routine communication (priority "other") with another ship earth station | 1.Attempt  2.Attempt | Initiating a routine communication (priority "other") with a land subscriber | 1.Attempt  2.Attempt |

**III Compulsory Tasks – Maritime Mobile Satellite Service – Inmarsat-C**

Conducting GMDSS Distress, Urgency Safety and Other traffic in English language by means of case examples on an approved networked radio simulation equipment or functional dummy loaded Inmarsat C device.

|  |  |  |  |
| --- | --- | --- | --- |
| **Examinee 1** | | **Examinee 2** | |
| Set type of EGC message | 1.Attempt  2.Attempt | Set type of EGC receiving area | 1.Attempt  2.Attempt |
| Initiate a distress alert including kind of distress | 1.Attempt  2.Attempt | Initiate a distress alert including kind of distress | 1.Attempt  2.Attempt |
| Transmitting a safety message to a NAVTEX Coordinator | 1.Attempt  2.Attempt | Request medical advice by means of 2-digit access code | 1.Attempt  2.Attempt |
| Transmitting a telex message (priority "other") to another SES | 1.Attempt  2.Attempt | Transmitting a telex message (priority "other") to a land subscriber | 1.Attempt  2.Attempt |
| Reading out receiving-, transmitting-and EGC memory, |  | Reading out receiving-, transmitting-and EGC memory, |  |
| Close down operation state | 1.Attempt  2.Attempt | Close down operation state | 1.Attempt  2.Attempt |

The examinee shall pass all compulsory tasks successfully latest in the second attempt.

**IV Compulsory Tasks – Maritime Mobile Satellite Service – Iridium GMDSS Terminal**

Conducting GMDSS Distress, Urgency, Safety and Other traffic in English language by means of case examples on an approved networked radio simulation equipment or functional dummy loaded Iridium GMDSS Terminal device.

|  |  |  |  |
| --- | --- | --- | --- |
| **Examinee 1** | | **Examinee 2** | |
| Set type of EGC message | 1.Attempt  2.Attempt | Set type of EGC receiving area | 1.Attempt  2.Attempt |
| Release a distress alert and transmit the distress by telephony | 1.Attempt  2.Attempt | Release a distress alert and transmit the distress message | 1.Attempt  2.Attempt |
| Conducting distress traffic | 1.Attempt  2.Attempt | Conducting distress traffic | 1.Attempt  2.Attempt |
| Request medical advice by means of 2-ditgit access codes | 1.Attempt  2.Attempt | Request medical advice by means of 2-digit access codes via telephony | 1.Attempt  2.Attempt |
| Transmitting of a safety message to a land subscriber | 1.Attempt  2.Attempt | Transmitting of a safety message to a ship earth station | 1.Attempt  2.Attempt |
| Initiating a routine communication (priority "other") with another ship earth station | 1.Attempt  2.Attempt | Initiating a routine communication (priority "other") with a land subscriber | 1.Attempt  2.Attempt |

**V Additional Tasks Remarks of the Examiner**

**VHF DSC**

|  |  |
| --- | --- |
| Calling a VTS station | 1.Attempt  2.Attempt |
| Set up dual watch function | 1.Attempt  2.Attempt |
| Decrease or increase power level | 1.Attempt  2.Attempt |
| Using the squelch and explaining its function | 1.Attempt  2.Attempt |
| **MF/HF and Radio-telex** |  |
| Tuning the routine DSC scan frequencies | 1.Attempt  2.Attempt |
| MF/HF: Install a ship to ship communication (DSC/Telephony) | 1.Attempt  2.Attempt |
| MF/HF: Install a ship to ship communication (DSC/Telex)) | 1.Attempt  2.Attempt |
| MF/HF: Transmitting a message to all stations (DSC/Radio-telex FEC) | 1.Attempt  2.Attempt |
| Radio-telex: Edit address book (ship station, land subscriber) | 1.Attempt  2.Attempt |
| Radio-telex: Tune scan frequencies | 1.Attempt  2.Attempt |
| MF/HF: install a ship-to-ship communication by ACS | 1.Attempt  2.Attempt |

**NAVTEX, EPIRB, Radar SART, AIS-SART**

|  |  |
| --- | --- |
| Set up NAVTEX: kinds of messages and coast stations | 1.Attempt  2.Attempt |
| Testing and releasing of an EPIRB | 1.Attempt  2.Attempt |
| Testing and releasing of a radar SART and an AIS-SART | 1.Attempt  2.Attempt |

**V Additional Tasks Remarks of the Examiner**

**Inmarsat-Fleet Safety**

|  |  |
| --- | --- |
| Edit and save a telex message | 1.Attempt  2.Attempt |
| Changing Satellite and land earth station | 1.Attempt  2.Attempt |
| Edit address book (ship station, land subscriber) | 1.Attempt  2.Attempt |
| Reading out receiving-, and transmitting memory | 1.Attempt  2.Attempt |
| **Inmarsat-C** |  |
| Transmitting a test message to the own SES | 1.Attempt  2.Attempt |
| Edit and save a telex message | 1.Attempt  2.Attempt |
| Changing Satellite and land earth station | 1.Attempt  2.Attempt |
| Edit address book (ship station, land subscriber) | 1.Attempt  2.Attempt |
| Transmitting a distress priority message | 1.Attempt  2.Attempt |

**Iridium GMDSS Terminal**

|  |  |
| --- | --- |
| Edit and save an SMS | 1.Attempt  2.Attempt |
| SES set up | 1.Attempt  2.Attempt |
| Edit address book (ship station, land subscriber) | 1.Attempt  2.Attempt |
| Reading out receiving, and transmitting memory | 1.Attempt  2.Attempt |

At least two of three additional tasks shall be successfully passed latest within the second attempt.

\_\_\_\_\_\_\_\_\_\_\_

# Appendix 2 – Instructor feedback on model course

* Introduction

1 IMO model courses are periodically revised to take into account the changes which have taken place in relevant Conventions, resolutions and other matters affecting each course. To help IMO to improve the content of courses when they are revised, the assistance of all instructors who implement or participate in implementing courses is requested, whether the implementation is part of an IMO technical co-operation project or part of a Maritime Training Academy's regular programme.

* Information requested and its format

2 To simplify their consolidation by IMO, the technical comments and suggestions for the improvement of model courses should follow the format that is outlined below. If no comments or suggestions are to be provided under topic, please insert "no comments" against the item.

3 Please identify:

1 the course number and title;

2 the date and location of its implementation;

3 the approximate number of IMO model courses you have implemented to date; and

4 the approximate number of times you have implemented this particular model course.

4 In commencing on Part A – Course Framework, please comment on the items (`Scope', 'Objectives', etc.) in the order in which they appear in the course; in all cases, please indicate:

1 the number of participants who met the entry standards and the number who did not;

2 the course intake and, if the recommendations in 'Course intake limitations' were exceeded, the reasons for this and your observations on the effect of this on the quality of the course;

3 if conditions under 'Staff requirements' were met; if not, please indicate the nature of the deficiency and give your observations of the effect of this on the quality of presentation of the course; and

4 any lack of equipment or facilities as compared with the recommendations under 'Teaching facilities and equipment' and your observations of the effect on this lack on the quality of presentation of the course.

5 In commenting on Part B – course Outline, please bear in mind that minor variations in time allocations are inevitable. Major difficulties with allocations of time and any omissions or redundancies of subject areas should be briefly explained.

6 In commenting on Part C – Detailed Teaching Syllabus, please identify the specific learning objectives concerned by their paragraph numbers.

7 In commenting on Part D – Instructor's Manual, please clearly identify the section concerned. If the bibliography or the practical exercises are found to be unsatisfactory, please identify suitable alternative texts, as far as possible, or outline alternative exercises, as appropriate.

8 In commenting on the compendium, please clearly identify the paragraphs being commented upon.

9 Any further comments or suggestions you may have which fall outside the scope of the items listed above may be added at the end. In particular, your views on the usefulness of the course material to you in implementing the course would be appreciated, as would the contribution to IMO of any additional teaching material you found useful in implementing it.

Please address your comments to:

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1. Refer to the guidelines in the STCW Code (section B-1/12, paragraph 72) regarding the use of simulators in training for seafarers. [↑](#footnote-ref-1)