Course guide
280624 - 280624 - Radio Communications

Unit in charge: Barcelona School of Nautical Studies
Teaching unit: 707 - ESAII - Department of Automatic Control.
Degree: BACHELOR’S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010). (Compulsory subject).
Academic year: 2022  ECTS Credits: 6.0  Languages: Catalan, Spanish, English

LECTURER
Coordinating lecturer: JOSE DEL FANTE SERRA
Others: Segon quadrimestre: JOSE DEL FANTE SERRA - GNTM

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES
Specific:
1. Knowledge and expertise in the use and operation of radiocommunication systems. Global Maritime Distress and Safety System (GMDSS), safety procedures, equipment s and communication protocols.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT
The main objective is to know the GMDSS devices onboard the ships and the correct utilization in routine operation and emergency situations.

Competencies
The specific CE.28 and additionally in the chart A-II/1 of the STCW convention: “Respond to a distress signal at sea”.

STUDY LOAD

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<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<td>Hours large group</td>
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<td>Hours small group</td>
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<td>Hours medium group</td>
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Total learning time: 150 h
**CONTENTS**

**GMDSS**

**Description:**
The GMDSS / GMDSS Bases
Introduction
The SOLAS Convention (SEVIMAR) of 1974
The GMDSS / GMDSS
The Maritime Areas
Maintenance requirements
Radio personnel on board
Devices used in all the Maritime Areas
Listening
Radio Station License
Manuals and publications that must be carried on board
Radio Journal (Radio Log)
Test and check of GMDSS equipment
Daily test
Weekly test
Monthly test
Time zones (Husos)
UTC (GMT) or Z (ZULU)
Local Time (LT)
The pricing system for maritime communications

**Full-or-part-time:** 1h
Theory classes: 1h

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**Power Supply, UPS's, Fuses and Batteries**

**Description:**
Power supply of radiocommunication equipment
UPS (Uninterruptible Power System)
UPS On Line
UPS Off Line
Fuses
Types of fuses
Check fuses
Batteries
Fundamentals of batteries
Characteristics of batteries
Batteries connected in series
Batteries connected in parallel
Batteries connected in Series / Parallel
Connecting batteries to the circuit
Types of batteries
Primary
Secondary
Care and maintenance of batteries
Replacing batteries

**Full-or-part-time:** 1h 30m
Theory classes: 1h 30m
Antennas

**Description:**
Introduction
The antennas
Calculating the length of an antenna
Reflected Power (Stationary Waves)
VHF antennas
Types of cable
Antennas of MF / HF (OM / OC)
ATU or Antenna Coupling Unit
Maintenance of antennas
Load antennas (Dummy load)
Radar's antennae

**Full-or-part-time:** 1h 30m
Theory classes: 1h 30m

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Modulación y Tipos de Emisión

**Description:**
Modulation
Amplitude Modulation (AM)
Frequency Modulation (FM)
Phase Modulation
Graphic images of amplitude modulation (AM)
Graphic images of Frequency Modulation (FM)
Meaning of the characters of the emission types (Table)
Table of the main emission types

**Full-or-part-time:** 0h 40m
Theory classes: 0h 40m
Radio Waves Propagation

Description:
The Propagation of Radio Waves
Frequency
Wavelength
Types of Propagation
Direct Wave or Line of Sight (Direct Wave / Line of Sight)
Ground Wave (Ground Wave)
Waves in the Ionosphere (Sky Wave)
Waves in Space (Space Wave)
Direct beam
Indirect beam
Skip Distance
Dead Zone or Zone of Silence
Shadow Zone
The Ionosphere
Frequency Bands and their propagation
VLF (Very Low Frequency)
LF (Low Frequency)
MF (Medium Frequency)
VHF (Very High Frequency) and higher bands
Calculation of coverage in VHF

Full-or-part-time: 2h
Theory classes: 2h

RT Procedures

Description:
The Procedures in Radiotelephony
Types of Calls
DISTRESS (MAYDAY)
URGENCY (PAN PAN)
SAFETY (SECURITE)
ROUTINE
International codes Numerical and Alphabetical

Full-or-part-time: 4h
Theory classes: 4h
### Digital Selective Calling (DSC)

**Description:**
Digital Selective Call (DSC / LSD)
Types of Calls
DISTRESS
URGENCY
SAFETY
ROUTINE
Functions of the DSC
MMSI
Types of MMSI: Ship, Coastal and Group
General call procedures in DSC
Table of approved words to specify a danger
Types of DSC VHF controllers. Class A and Class D

**Full-or-part-time:** 2h
Theory classes: 2h

### Radio VHF (VHF Transceiver)

**Description:**
VHF Radio (Very High Frequency)
The Basics of VHF Radio
Installing the VHF radio
Location of the VHF antenna
Connected to navigation system
VHF portable vs fixed VHF
Requirements of the SOLAS Convention (SEVIMAR)
Basic functions of a VHF radio
The VHF channels
Simplex
Duplex
Full Duplex
Semi Duplex (Half Duplex)
Use of VHF channels
Table of VHF channels
VHF DF System (Direction Finder)

**Full-or-part-time:** 1h 30m
Theory classes: 1h 30m
Radio MF/HF

Description:
Radio MF/HF
The Basics of Radio MF/HF
Installing the MF/HF radio
Location of the MF/HF antenna
Connected to the navigation system
Requirements of the SOLAS Convention (SEVIMAR)
Basic functions of a MF/HF radio
The MF/HF channels
Simplex
Duplex
Full Duplex
Semi Duplex (Half Duplex)
Use of channels and frequencies in MF
Use of channels and frequencies in HF
Map of HF coastal stations in the world

Full-or-part-time: 1h 30m
Theory classes: 1h 30m

Radiotelex and Radiofacsimil

Description:
The Radiotelex
Transmission systems in radiotelex
ARQ (Automatic Repeat on reQuest)
FEC (Forward Error Correction)
SELPEC
Radiotelex. Manual and automatic connection
Procedure and call techniques
Radiofacsimile

Full-or-part-time: 0h 40m
Theory classes: 0h 40m
Inmarsat

Description:
The Inmarsat System
Inmarsat satellite network
Satellite propagation
The Space Segment
Ocean Regions
The Earth Segment
Coordination of the Inmarsat Network
SES (Ship Earth Station)
The current GMDSS satellite systems
Inmarsat C
Operation of the Inmarsat C terminal
Login and Logout
Communications in Inmarsat C
EGC (Enhanced Group Call). SafetyNet. FleetNet
How to create a message
Types of messages
Telex
Fax
Data
E-mail
SMS
Calculating the cost of a message
Emergency calls
Distress button and software option
How to cancel a false call
Urgency and Security Calls
Routine checks on Inmarsat C
Fault code table
Table of special codes of two digits
Inmarsat Fleet 77 or F77
Phone calls in inmarsat F77
End of Fleet services 33, 55 and 77
The new satellite systems
Fleet One
Fleet Broadband 250, 500
Fleet Xpress
Safety on vessels
Ship Security Systems (SSAS) (anti-piracy security)
Long Range Identification and Tracking (LRIT) of ships

Full-or-part-time: 2h
Theory classes: 2h
MSI Maritime Safety Information

Description:
The MSI messages
Navareas
Types of MSI notifications
Navarea
Coastal
Local
Metareas
The NAVTEX system
Requirements of the SOLAS Convention (SEVIMAR)
NAVTEX messages
Type of messages
Examples of messages
EGC (Enhanced Group Call) services. SafetyNet. FleetNet

Full-or-part-time: 1h 30m
Theory classes: 1h 30m

EPIRB (Emergency Position Indicating Radio Beacon)

Description:
The Basics of radio beacons
Mandatory registration
Components of radio beacons
The radio beacons released and activated manually
The radio beacons released and activated automatically
What happens when a beacon is activated
Where the beacon is placed
The requirements of the SOLAS Convention (SEVIMAR)
The COSPAS-SARSAT satellite systems
The LEOSAR satellites
The GEOSAR satellites
The MEOSAR satellites
COSPAS-SARSAT Follow-up on land
LUT stations (Local Users Terminal)
MCC control stations (Mission Control Centers)
How to activate a radio beacon
How to cancel a false alarm
Other types of radio beacons
VHF radio beacon (VPIRB)
Personal Radio Beacons (PLB's) of 121.5 Mhz
Personal Radio Beacons (PLB's) of 406 Mhz

Full-or-part-time: 2h
Theory classes: 2h
### SART (Search and Rescue Radar Transponder) / AIS-SART

**Description:**
The Radar Transponder (SART)
The basics of SART
Operation of the device
Correct installation of the SART
Storage of the SART
AIS-SART
Identification of the AIS-Sart signal
Requirements of the SOLAS Convention (SEVIMAR)

**Full-or-part-time:** 1h
Theory classes: 1h

### VHF portátil GMDSS Marítimo y Aéreo

**Description:**
The maritime portable VHF (GMDSS)
The emergency aerial band VHF

**Full-or-part-time:** 0h 30m
Theory classes: 0h 30m

### AIS Automatic Identification System

**Description:**
AIS (Automatic Identification System)
AIS system operation
Types of AIS
AIS Class A
AIS Class B
AIS Receiver Class B
Advantages of AIS over RADAR

**Full-or-part-time:** 1h
Theory classes: 1h

### Annex

**Description:**
Annex1: Summary and translation of standard sentences in English for emergency radiocommunications.
Annex2: INTERCO - International Code of Signals
Annex3: Spanish Coastal Stations and Maritime Rescue for zones A1, A2 and A3 (source: web Ministry of Development 02/15/2016)
Annex4: Table of frequencies for the maritime mobile service
Annex5: Table of marine frequencies VHF USA
Annex6: Table of marine frequencies VHF INTL
Annex7: Table of maritime frequencies MF / HF
Distress frequencies MF/HF RT/DSC
Frequencies MF/HF RT USB Ship to Ship (boat-ship)
Annex8: International List of MIDs by country

**Full-or-part-time:** 0h 30m
Theory classes: 0h 30m
**Glossary of Abbreviations**

**Description:**
Abbreviations Glossary

**Full-or-part-time:** 0h 30m
Theory classes: 0h 30m

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**GRADING SYSTEM**

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**BIBLIOGRAPHY**

**Basic:**

**Complementary:**

**RESOURCES**

**Audiovisual material:**

**Hyperlink:**
- Convenio internacional para la seguridad de la vida humana en el mar (SOLAS)