



Teaching Guide

Identifying Data					2024/25
Subject (*)	Nautical simulation	Code	631G01402		
Study programme	Grao en Náutica e Transporte Marítimo				
Descriptors					
Cycle	Period	Year	Type	Credits	
Graduate	1st four-month period	Fourth	Optional	6	
Language	SpanishGalician				
Teaching method	Face-to-face				
Prerequisites					
Department	Ciencias da Navegación e Enxeñaría Mariña				
Coordinador	Lama Carballo, Francisco Javier	E-mail	javier.lama@udc.es		
Lecturers	Lama Carballo, Francisco Javier Lopez Varela, Pablo Salgado Don, Alsira	E-mail	javier.lama@udc.es pablo.lopez@udc.es alsira.salgado@udc.es		
Web					
General description	<p>O traballo da materia centrarase na realización de exercicios de carácter práctico relacionados cos conceptos teóricos desenvolvidos naquelas materias de manobra e navegación de cursos anteriores. Estes exercicios levan a cabo no simulador de manobra e navegación.</p> <p>Ao longo do curso propónse distintos escenarios e diferentes modelos de buque ao obxecto de que o alumno desenvolver cada exercicio nun ambiente o máis próximo posible á realidade e que adquire unha bagaxe adecuada de experiencias que complementen os coñecementos teóricos adquiridos.</p>				

Study programme competences / results

Code	Study programme competences / results
A10	Redactar e interpretar documentación técnica e publicacións náuticas.
A14	Planificar e dirixir unha travesía, determinar a situación por calquera medio de navegación, e dirixir a navegación.
A15	Realizar unha garda de navegación segura.
A16	Manter a seguridade da navegación utilizando o radar, a ARPA e os modernos sistemas de navegación para facilitar a toma de decisións.
A17	Adoptar as medidas axeitadas en casos de emerxencias.
A21	Manobrar e gobernar o buque en todas as condicións.
B4	Comunicarse de xeito efectivo nun ámbito de traballo.
B5	Traballar de forma autónoma con iniciativa.
B6	Traballar de forma colaboradora.
B22	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
B36	RA14H?Use information and communication technology (ICT) tools necessary for the exercise of their profession and for lifelong learning.
B38	RA23H?Using radar and ARPA for safe navigation
B39	RA24H?Using the ECDIS for safe navigation
B45	RA38H?Applying leadership and teamwork qualities
B46	RA41H?Determine by any means the location and accuracy of the resulting point
B47	RA42H?Determining and compensating for compass errors
B49	RA44H?Establishing on-call duty systems and procedures
B50	RA45H?Maintaining safe navigation by using information from equipment and navigation systems to facilitate decision-making
B51	RA46H?Maintain safe navigation using ECDIS and related navigation systems to facilitate decision making.
B53	RA50H?Operate the remote controls of propulsion installations and machine systems and services
B57	RA58H?Using leadership and management qualities
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.



C10	Que os estudantes saiban aplicar os coñecementos adquiridos e a súa capacidade de resolución de problemas en contornas novas ou pouco coñecidas dentro de contextos máis amplas (ou multidisciplinares) relacionados coa súa área de estudo
C18	RA21X?Planning and leading a voyage and determining the situation
C19	RA22X?Maintaining a safe navigational watch
C22	RA29X?Manoeuvring the ship
C29	RA40X?Planning a voyage and directing navigation
C30	RA48X?Take action in case of navigational emergencies
C31	RA49X?Manoeuvring and steering the ship in all conditions
C38	RA107X?Directing emergency intervention

Learning outcomes			
Learning outcomes	Study programme competences / results		
Ability to carry out safe navigation taking into account all available navigation systems and in all conditions, acquiring the skills, knowledge and attitudes regarding their use established in the tables of section A-II/1 of the 2010 STCW Convention	A10	B4	C3
	A14	B5	C6
	A15	B6	C7
	A16	B22	C10
	A17	B36	C18
	A21	B38	C19
		B39	C22
		B45	C29
		B46	C30
		B47	C31
		B49	C38
		B50	
		B51	
Ability to manage the AIS system, satellite positioning systems, echo sounders, logs, autopilot and other instruments and bridge navigation aids, acquiring the skills, knowledge and attitudes regarding their use established in the tables of the section A-II/1 of the 2010 STCW Convention.	A10	B4	C3
	A14	B5	C6
	A15	B6	C7
	A16	B22	C10
	A17	B36	C19
	A21	B38	C22
		B39	C29
		B50	C30
		B51	C31
		B53	C38



<p>Ability to manage radar and ARPA systems, acquiring the skills, knowledge and attitudes regarding the use of ARPA established in the tables of sections A-II/1 and A-II/2 of the 2010 STCW Agreement, as well as in Order FOM/2296/2002, of September 4, 2002.</p>	<p>A10 A14 A15 A16 A17 A21</p>	<p>B4 B5 B6 B22 B36 B38 B39 B45 B46 B47 B50 B51</p>	<p>C3 C6 C7 C10 C18 C19 C22 C29 C30 C31 C38</p>
<p>Ability to manage electronic chart information and display systems (ECDIS), acquiring the skills, knowledge and attitudes regarding the use of ECDIS established in the tables of sections A-II/1 and A-II/2 of the Convention STCW 2010, as well as in the OMI 1.27 Model Course.</p>	<p>A10 A14 A16</p>	<p>B4 B5 B6 B22</p>	<p>C3 C6 C7 C10</p>
<p>Ability to maneuver the ship at an operational level to acquire the skills, knowledge and skills specified in table A-II/1 of the 2010 STCW Convention</p>	<p>A10 A14 A15 A16 A17 A21</p>	<p>B4 B5 B6 B22 B36 B38 B39 B45 B46 B47 B50 B51 B53 B57</p>	<p>C3 C6 C7 C10 C18 C19 C22 C29 C30 C31 C38</p>

Contents	
Topic	Sub-topic



ARPA exercises

radar navigation

Knowledge of radar fundamentals and Automatic Radar Pointing Aids (ARPA)

Ability to use radar and to interpret and analyze the information obtained, taking into account the following:

Operation, including:

- 1.- factors that affect its performance and precision
- 2.- initial adjustment and conservation of the image
- 3.- detection of deficiencies in the presentation of information, false echoes, sea echoes, etc.,

radio beacons and RESAR

Use, including:

- 1.-scope and marking; course and speed of other vessels; moment and distance of closest approach of a vessel that crosses, that comes back met or that reaches .
- 2.- identification of critical echoes; detection of course and speed changes of other ships; effect of such changes on the ship's course and speed
- 3.- Application of the International Regulations to Prevent Collisions, 1972, as amended
- 4.-pointing techniques and concepts of relative and true movement
- 5.- parallel indices

Ability to use the ARPA, interpret and analyze the information obtained, taking into account the following:

- 1.-system performance and accuracy, monitoring capacity and limitations, and system processing delays
- 2.- Use of operational warnings and system tests
- 3.- target capture methods and their limitations
- 4.- true and relative vectors, graphic representation of information about targets and danger zones and
- 5.- Deduction and analysis of information, critical echoes, exclusion zones and test maneuvers.



ECDIS exercises	<p>Navigation with ECDIS.</p> <p>Knowledge of the capabilities and limitations of ECDIS operations, including:</p> <ol style="list-style-type: none">1.- In-depth knowledge of Electronic Nautical Chart (CNE) data, data accuracy, presentation rules, display options, and other chart data formats.2.- the dangers of excessive dependence3.- The degree of familiarity with respect to the ECDIS functions required by the operating regulations in force <p>Adequacy in terms of the use, interpretation and analysis of information obtained from ECDIS, including:</p> <ol style="list-style-type: none">1.- The use of functions that are integrated into other navigation systems in various installations, including proper operation and adjustment with the desired values.2.- the safe tracking and adaptation of the information, including the own situation, the visualization of the marine zone, the modality and the orientation, the cartographic data displayed, the tracking of the track, the information levels created by the user, contacts (where there are interfaces with AIS and/or radar tracking) and radar overlay functions (where there are interfaces)3.- Confirmation of the ship's situation with alternative means4.- Effective use of settings to ensure compliance with operational parameters, including grounding alarm parameters, proximity to contact points and special areas, integrity of mapping data, and updating of letters, and auxiliary means5.- the adequacy of the adjustments and the values to adapt them to the current conditions; and6.- situational awareness when using ECDIS, including aspects such as safe waters and proximity to hazards, current direction and speed, chart data and scale selection, suitability of track, detection and management of contact points and sensor integrity
Ship handling exercises	<p>Maneuvering and steering of the ship at the operational level:</p> <ol style="list-style-type: none">1.- Effect of deadweight tonnage, draft, trim, speed, water under the keel on the ship's evolution curves and stopping distances.2.- Effect of wind and current on the government.3.- Maneuver and procedure M.O.B.4.- Squat and shallow water5.- Analysis of the behavior of the different types of ships6.- Appropriate anchoring and mooring procedures.7.- Maneuvers with the help of tugboats8.- Maneuvers in adverse weather conditions9.- Advanced maneuvers10.- Basic anchoring and mooring procedures
Navigation exercises	<p>Steering gear control systems: Knowledge of steering gear control systems, operational procedures and transition from manual to automatic, and vice versa. Knob adjustment for best performance</p> <p>Carrying out a safe navigation watch.</p> <p>Use of other navigational aids.</p> <p>Practical application of the principles of naval kinematics.</p> <p>Defeat planning.</p> <p>Use of traffic separation devices, carrying out maneuvers in and around them, as well as in the areas covered by the maritime traffic services (STM)</p>



Note: The development of the above contents complies with column 2, Knowledge, Understanding and Sufficiency, of the STCW Convention, modified by Manila 2010, of table AII/1.	.
The development and improvement of these contents, together with those corresponding to other subjects that include the acquisition of specific competences of the degree, guarantee the knowledge, understanding and sufficiency of the competences included in table AII/2, of the STCW Agreement, related to the management level of First Deck Officer of the Merchant Navy, without limitation of gross tonnage and Captain of the Merchant Navy up to a maximum of 3,000 GT.	Table A-II/2 of the STCW Agreement. Specification of the minimum competency standards applicable to Captains and first deck officers of ships with a gross tonnage equal to or greater than 500 GT.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Simulation	A10 A14 A15 A16 A17 A21 B57 B53 B51 B50 B49 B47 B46 B45 B39 B38 B36 B22 B6 B5 B4 C3 C6 C7 C10 C18 C19 C22 C29 C30 C31 C38	48	24	72
Document analysis	A10 A14 A17 A21 B5 C3 C7	2	18	20
Objective test	A10 A14 A15 A16 A17 A21 B57 B53 B51 B50 B49 B47 B46 B45 B39 B38 B36 B22 B6 B5 B4 C10 C18 C19 C22 C29 C30 C31 C38	4	32	36
Aprendizaxe servizo	B5 B6 C7	2.5	2.5	5
Case study	A10 A14 A17 A21 B5 B22 C6	3	12	15
Personalized attention		2	0	2

(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
Methodologies	Description
Simulation	Exercises carried out in a maneuvering and navigation simulator The students will be placed in hypothetical conditions that will simulate situations that could occur in a real context, in order to use them as learning experiences and evaluation procedures. In these simulations the students will demonstrate their skills in concrete situations, their knowledge, their ability to make decisions.



Document analysis	<p>Prior to carrying out the exercises in the simulator, the students will be provided with audiovisual and/or bibliographic documents, relevant to the subject matter.</p> <p>The documentation provided can be used in several ways:</p> <ul style="list-style-type: none"> - As an introduction both in the management of the different equipment that the simulator has, as well as in the exercises to be carried out, depending on the purpose pursued with them. - As an application instrument to the previous study of cases that will be analyzed later in simulation exercises. - For the theoretical explanation of processes and situations whose result or practical behavior can be observed in the simulator, but which require further analysis. - As a summary of content that the student should have acquired previously.
Objective test	<p>Written test/s used for the evaluation of learning, whose distinctive feature is the possibility of determining if the answers given are correct or not. It/they constitutes/constitute a measurement instrument, rigorously elaborated, that allows to evaluate knowledge, capacities, skills, performance, etc.</p> <p>The objective test/s can combine different types of questions: multiple-choice, short-answer, and/or development questions. It/they can also be built with a single type of any of these questions.</p>
Aprendizaxe servizo	<p>A methodology that combines the service to the community with the learning in an only project, in which students work on the real needs of their surroundings with the end of improving it.</p> <p>It will pose to the students enrolled in the matter the possibility of participating in an activity learning service with some entity collaborator. The number of hours devoted, therefore, to this activity will be the sum of the planned for each activity, that is to say; 2.5 hours of face-to-face work and 2.5 hours of autonomous work.</p>
Case study	<p>In this methodology, students will face the description of a specific situation, with a specific problem, which must be valued, understood and resolved, through a group discussion process. The case presented will represent a possible real situation in which the student may find himself in his future professional life, and must be able to analyze a series of facts to reach a reasoned decision through a process of discussion in small groups. Once analyzed, the cases will be represented in the maneuver and navigation simulator to compare the results.</p>

Personalized attention

Methodologies	Description
Document analysis Simulation Aprendizaxe servizo	<p>The simulation exercises, when carried out in small groups and with the support of two teachers, allow continuous personalized monitoring in the simulator itself.</p> <p>In the same way, the monitoring of the results of the analysis of documentary sources entrusted to the students will be carried out in the simulator itself, firstly in the minutes before the start of the exercises, and later during their completion.</p> <p>If necessary, the possibility of carrying out additional personalized tutorials to follow all the methodologies is left open.</p>

Assessment

Methodologies	Competencies / Results	Description	Qualification
Objective test	A10 A14 A15 A16 A17 A21 B57 B53 B51 B50 B49 B47 B46 B45 B39 B38 B36 B22 B6 B5 B4 C10 C18 C19 C22 C29 C30 C31 C38	<p>Additionally the realization of the exercises of simulation will have to surpass an examination-type test, which will evaluate the degree of fulfillment of the students of the competitions to reach.</p> <p>This examination will suppose 90% of the note of the matter.</p> <p>With this methodology, the skills A10 A14 A15 A16 A17 A21 B22 B6 B5 B4 B51 B50 B49 B47 B46 B45 B39 B38 B57 B53 B36 C3 C6 C7 C10 C18 C19 C22 C29 C30 C31 C38</p>	80



Simulation	<p>A10 A14 A15 A16 A17 A21 B57 B53 B51 B50 B49 B47 B46 B45 B39 B38 B36 B22 B6 B5 B4 C3 C6 C7 C10 C18 C19 C22 C29 C30 C31 C38</p>	<p>The exercises of simulation that make to the length of the course will be separated into two categories, navigation and maneuvering, a separation that does not involve an independent realization, since they can expose exercises that join both categories.</p> <p>The qualification of this methodology will make in the function of the assistance the exercises of simulation and of the continuous follow-up of the evolution of each student, constituting this methodology 100% of the note of this part and, therefore, 10% of the final note of the matter.</p> <p>Any type of proof, activity or exercise that pose to the students for his realization of synchronous or asynchronous form will form part of the continuous follow-up of the exercises of simulation. The realization of these exercises, activities and/or proofs will be obligatory for the superación of the matter by continuous evaluation.</p> <p>With this methodology will evaluate the competitions A10 A14 A15 A16 A17 A21 B22 B6 B5 B4 B51 B50 B49 B47 B46 B45 B39 B38 B57 B53 B36 C3 C6 C7 C10 C18 C19 C22 C29 C30 C31 C38</p>	20
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Assessment comments

Since this course includes the mandatory ARPA and ECDIS practices for the evaluation of the competence established in Order FOM/2296/2002, of September 4, 2002 and in the OMI 1.27 Model Course, and which will empower the student To obtain the ARPA automatic pointing radar specialty certificates and the ECDIS electronic chart information and display system (once they pass the rest of the subjects in which the corresponding theoretical training is given), a minimum attendance of the 80% of the simulation exercises of each one of the parts. Those students who do not meet this minimum attendance will be graded with a grade below 5, and will not be able to pass the subject. The practices are not recoverable and, therefore, students who have not met the requirements of attendance to them will not be able to pass this part by continuous evaluation. However, students with recognition of part-time dedication and academic exemption from assistance, second establishes the "RULE THAT REGULATES THE REGIME OF DEDICATION TO THE STUDY OF UNDERGRADUATE STUDENTS AT UDC (Arts. 2.3; 3. b; 4.3 and 7.5) (05/04/2017) or those who are on board at the time the practices are given, could be exempted from complying with all 80% of the simulation exercises as long as the faculty considers that their experience on board could compensate part, or all, of the assistance. In this case, the teaching staff will decide what type of evaluation will be carried out on the student to be sure that they have acquired the corresponding skills. This evaluation could also be carried out in 1st or 2nd year chance.

The evaluation criteria contemplated in tables A-II/1 of the STCW Code related to this matter and included in the Quality Assurance System will be taken into account when designing and carrying out the evaluation.

The fraudulent completion of the tests or evaluation activities, once verified, will directly imply the grade of failing "0" in the subject in the corresponding call, thus invalidating any grade obtained in all the evaluation activities with the face uncovered in the extraordinary call.

Sources of information

Basic	<p>INTEGRATED BRIDGE SYSTEMS VOL 1: RADAR AND AIS - The Nautical Institute INTEGRATED BRIDGE SYSTEMS VOL 2: ECDIS AND POSITIONING - The Nautical Institute RADAR NAVIGATION AND MANEUVERING BOARD MANUAL ? National Imagery And Mapping Agency (http://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_pageLabel=msi_portal_page_62&pubCode=0008) RADAR AND ARPA MANUAL ? A. G. Bole & W.O. Dineley BRIDGE TEAM MANAGEMENT. A PRACTICAL GUIDE ? Capt. A.J. Swift ? The Nautical Institute THE ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM (ECDIS): AN OPERATIONAL HANDBOOK - Adam Weintrit CONVENIO INTERNACIONAL PARA LA SEGURIDAD DE LA VIDA HUMANA EN EL MAR (SOLAS) TRATADO DE MANIOBRA. Tomo I Fundamentos. Barbudo Escobar, I. Ed. Fragata, Madrid 2004. TRATADO DE MANIOBRA. Tomo II Maniobras a bordo y en la Mar. Barbudo Escobar, I. Ed. Fragata, Madrid 2000. THE SHIPHANDLER'S GUIDE. Rowe, R.W., The Nautical Institute, 2ª ed., London 2000. TRATADO DE MANIOBRA Y TECNOLOGÍA NAVAL. Costa, J.B., Madrid 1991. MANIOBRA DE BUQUES. Mari Sagarra, Ricard, , Ediciones UPC 3ª ed. Barcelona 1999. SHIPHANDLING WITH TUGS. Reid, George H. Ed. Cornell Maritime Press, Maryland 1986.</p>
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Complementary	MANUALES DE LOS EQUIPOS QUE CONFIGURAN EN SIMULADOR DE MANIOBRA Y NAVEGACIÓN (Disponibles en Moodle y en el aula).
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Recommendations

Subjects that it is recommended to have taken before

Navigation I/631G01202
Ship Manoeuvring I/631G01207
/
Navigation II/631G01306
Collision Rules, Signals, Bouyage Systems and ISM Code/631G01303
Ship Manoeuvring II/631G01309

Subjects that are recommended to be taken simultaneously

Maritime Radiocommunications/631G01307

Subjects that continue the syllabus

Other comments

The work of this subject will focus on carrying out exercises of a practical nature related to the theoretical concepts developed in those subjects of maneuver and navigation of previous courses. In this way, it will be practically impossible for a student who has not acquired the skills of the subjects that it is recommended to take previously to carry out a useful follow-up of this subject in the previous year. This course includes the practical simulation contents corresponding to the specialty course "ECDIS: Electronic Charts" (12.5 hours) established in Section A-II/1 and A-II/2 of the STCW 2010, in accordance with the OMI model course. 1.27, which are broken down below: 1.- ECDIS elements 2.- The sea guard with ECDIS 3.- Monitoring and planning of the ECDIS route 4.- Targets, charts and ECDIS systems 5.- Responsibility and ECDIS evaluation To obtain the specialty certificate "ECDIS: Electronic charts" it is necessary to pass this subject and the Navigation II subject (631G01306), which includes the corresponding theoretical contents (40 hours in total). This subject also includes the practical simulation contents corresponding to the specialty course "Automatic Pointing Radar (ARPA)" (18 hours) established in Section A-II/1 and A-II/2 of the STCW 2010, covering, among others, the following: - Knowledge of the basics of radar and automatic radar spotting aids (APRA). - Ability to use radar and to interpret and analyze the information obtained. - Use. - Ability to use the APRA, interpret and analyze the information obtained. - Determination of the situation. - Assessment of system errors and deep understanding of operational aspects. - Planning pilotage without visibility. - Evaluation of the nautical data obtained in order to adopt and apply decisions that allow avoiding collision and directing the safe navigation of the ship. All this in accordance with the program established in ORDER FOM/2296/2002, of September 4, whose content is broken down in "Theme 1: ARPA Practices" of this teaching guide, and also taking into account the guidelines established in the OMI model courses 1.07 and 1.08. To obtain the specialty certificate "Automatic Pointing Radar (ARPA)" it is necessary to pass this subject and the Navigation II subject (631G01306), which includes the corresponding theoretical contents (30 hours in total).

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.