Teaching Guide				
Identifying Data				2023/24
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 Pérez López, Lidia Salgado Don, Alsira	E-mail	javier.lama@udc.es pablo.lopez@udc.es lidia.perezl@udc.es alsira.salgado@udc.es	
Web				
General description	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. Ao longo do curso proponse 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 adquira unha bagaxe adecuada de experiencias que complementen os coñecementos teóricos adquiridos.			

Study programme competences	
Code	Study programme competences
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.
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.
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

Learning outcomes			
Learning outcomes	Study programme competences		
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 A14 A16 A17 A21	B4 B5 B6 B22	C3 C6 C7 C10

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.	A14 A16 A17	B4 B5 B6 B22	C3 C6 C7 C10
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.	A10 A14 A16 A17 A21	B4 B5 B6	C3 C6 C7 C10
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.	A10 A14 A16	B4 B5 B6 B22	C3 C6 C7 C10
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	A10 A14 A17 A21	B4 B5 B6 B22	C3 C6 C7 C10

Contents	
Topic	**Sub-topic**

ARPA exercices	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 exercices	Navigation with ECDIS. Knowledge of the capabilities and limitations of ECDIS operations, including: 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 dependence 3.- The degree of familiarity with respect to the ECDIS functions required by the operating regulations in force Adequacy in terms of the use, interpretation and analysis of information obtained from ECDIS, including: 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 means 4.- 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 means 5.- the adequacy of the adjustments and the values to adapt them to the current conditions; and 6.- 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 exercices	Maneuvering and steering of the ship at the operational level: 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 water 5.-Analysis of the behavior of the different types of ships 6.-Appropriate anchoring and mooring procedures. 7.-Maneuvers with the help of tugboats 8.-Maneuvers in adverse weather conditions 9.-Advanced maneuvers 10.- Basic anchoring and mooring procedures
Navigation exercices	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 Carrying out a safe navigation watch. Use of other navigational aids. Practical application of the principles of naval kinematics. Defeat planning. 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)

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	Ordinary class hours	Student?s personal work hours	Total hours
Simulation	A10 A14 A16 A17 A21 B4 B5 B6 B22 C3 C6 C7 C10	48	24	72
Document analysis	A10 A14 A17 A21 B5 C3 C7	2	18	20
Objective test	A10 A14 A16 A17 A21 B5 B22 C10	4	32	36
Case study	A10 A14 A17 A21 B5 B22 C6	4	16	20
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	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. The documentation provided can be used in several ways: - 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	Written test used for the evaluation of learning, whose distinctive feature is the possibility of determining if the answers given are correct or not. It constitutes a measurement instrument, rigorously elaborated, that allows to evaluate knowledge, capacities, skills, performance, etc. The objective test can combine different types of questions: multiple-choice, short-answer, and/or development questions. It can also be built with a single type of any of these questions.

Case study	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.

Personalized attention	
Methodologies	**Description**
Document analysis Simulation	The simulation exercises, when carried out in small groups and with the support of two teachers, allow continuous personalized monitoring in the simulator itself. 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. If necessary, the possibility of carrying out additional personalized tutorials is left open for the follow-up of the exercises carried out and the analysis of documentary sources, as well as for the resolution of doubts that they have about them, or about the theoretical aspects that affect them. the students.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Objective test	A10 A14 A16 A17 A21 B5 B22 C10	In the navigation part, in addition to carrying out the simulation exercises, a multiple choice exam must be passed, where the degree of compliance of the students with the competencies to be achieved will be evaluated. This exam will account for 90% of the grade for the navigation part (45% of the final grade for the subject). With this methodology, the skills A10, A14, A16, A17, A21, B5, B22 and C10 will be evaluated.	45
Simulation	A10 A14 A16 A17 A21 B4 B5 B6 B22 C3 C6 C7 C10	The simulation exercises that are carried out throughout the course will be separated into two categories, navigation and maneuvering, a separation that does not imply an independent realization, since exercises can be considered that unite both categories. In the subject both categories will be evaluated separately. In the maneuver part, the qualification of the subject will be based on the continuous monitoring of the simulation practices and the observation, by the teacher, of the evolution of each student, this methodology constituting 100% of the grade for this part. (and therefore 50% of the final grade for the course). If, in order to assess the student's evolution, the teacher considers the need for an objective test, the follow-up of the practices will account for 10% of the grade for this part (5% of the final grade for the subject), while 90% The rest will correspond to a multiple choice exam. This exam could be done at the same time as the one corresponding to the navigation part. In the navigation part, this follow-up will account for 10% of the grade for said part (5% of the final grade for the subject), while the remaining 90% will correspond to a multiple choice exam. With this methodology, the skills A10, A14, A16, A17, A21, B4, B5, B6, B22, C3, C6, C7 and C10 will be evaluated.	55

Assessment comments

The navigation and maneuvering parts will be evaluated independently, each one constituting 50% of the grade for the subject, requiring a minimum grade of 5 out of 10 to be able to average between them. If a grade of less than 5 is obtained in one of the two parts, the final grade for the subject will be the lower of the two grades obtained, even when the average between them is greater than 5. 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	INTEGRATED BRIDGE SYSTEMS VOL 1: RADAR AND AIS - The Nautical Institute INTEGRATED BRIDGE SYSTEMS VOL 2: ECDIS AND POSITIONING - The Nautical InstituteRADAR 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 HUMANAEN 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. Barcelona1999.SHIPHANDLING WITH TUGS. Reid, George H. Ed. Cornell Maritime Press, Maryland 1986.
Complementary	MANUALES DE LOS EQUIPOS QUE CONFIGURAN EN SIMULADOR DE MANIOBRA Y NAVEGACIÓN (Disponibles en Moodle y en el aula).

Recommendations
Subjects that it is recommended to have taken before
Navigation I/631G01202 Ship Manoeuvering I/631G01207 / Navigation II/631G01306 Collision Rules, Signals, Bouyage Systems and ISM Code/631G01303 Ship Manoeuvering 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 elements2.- The sea guard with ECDIS3.- Monitoring and planning of the ECDIS route4.- Targets, charts and ECDIS systems5.- Responsibility and ECDIS evaluationTo 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).espondentes (30 horas en total).