| Teaching Guide | | | | |
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| Identifying Data | | | | 2022/23 |
| Subject (*) | Management Control Ship Cargo Operations | | Code | 631510207 |
| Study programme | Mestrado Universitario en Náutica e Transporte Marítimo | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Official Master's Degree | 2nd four-month period | First | Obligatory | 6 |
| Language | SpanishEnglish | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | Ciencias da Navegación e Enxeñaría Mariña | | | |
| Coordinador | Prieto Cabo, Verónica | E-mail | v.prietoc@udc.es | |
| Lecturers | Prieto Cabo, Verónica | E-mail | v.prietoc@udc.es | |
| Web | | | | |
| General description | Capacitar aos alumnos en todo o relacionado coa xestión, planificación, control e transporte de cargas líquidas, cargas sólidas a granel e transporte de mercadorías perigosas | | | |

| Study programme competences / results | |
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| Code | Study programme competences / results |
| A12 | Capacidade para planificar e garantir o embarco, estiba e suxeción da carga, e o seu coidado durante a viaxe e o desembarco. |
| A13 | Capacidade para a avaliación das avarías e defectos notificados, nos espazos de carga, as tapas de escotilla e os tanques de lastre, e adoptar as medidas oportunas. |
| A14 | Capacidade para o transporte de mercadorías perigosas. |
| A15 | Capacidade para controlar o asento, a estabilidade e os esforzos. |
| A20 | Capacidade para organizar e administrar a atención médica a bordo. |
| B2 | Capacidade para resolver problemas de forma efectiva. |
| B5 | Capacidade para traballar de forma efectiva nunha contorna de traballo. |
| B11 | Capacidade para organizar, planificar e resolver problemas relativos ao departamento de navegación |
| B12 | CB6 -Posuír e comprender coñecementos que aporten unha base ou oportunidade de ser originais no desenvolvemento e/ou aplicación de ideas, a miúdo nun contexto de investigación |
| B13 | CB7-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 |
| C2 | Capacidade para dominar a expresión e a comprensión de forma oral e escrita nun idioma estranxeiro |
| C6 | Capacidade para valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse. |
| C10 | C10-Capacidade para aplicar os coñecementos adquiridos e a súa capacidade de resolución de problemas en contornas novas ou pouco coñecidas dentro de contextos máis amplos (ou multidisciplinares) relacionados coa súa área de estudo |

| Learning outcomes | | | |
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| Learning outcomes | Study programme competences / results | | |
| Planning and control of preparation of cargo spaces, loading and unloading operations, stowage and transport of solid cargos in bulk | AJ12<br>AJ13<br>AJ14<br>AJ15<br>AJ20 | BC2<br>BC11<br>BC12 | CC2<br>CC6<br>CC10 |

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| Planning and control of loading and unloading operations, inerting, water washig and crude oil washing of cargo tanks and discharge of oily residues. | AJ12<br>AJ13<br>AJ14<br>AJ15 | BC2<br>BC5<br>BC11<br>BC13 | CC6 |
| To know the properties and dangers of dangerous goods (IMDG Code) and actions to take in case of an emergency | AJ12<br>AJ13<br>AJ14<br>AJ15<br>AJ20 | BC2<br>BC5<br>BC11<br>BC13 | CC6 |
| Capacity to detect damages in the cargo spaces, ballast tanks, hatches and other structural damages and to do damage reports. | AJ12<br>AJ13<br>AJ14<br>AJ15 | BC2<br>BC5<br>BC11<br>BC13 | CC6 |
| Capacity to do and design cargo lashing  plans in order to avoid damages and/or accidents | AJ12<br>AJ13<br>AJ14<br>AJ15 | BC2<br>BC5<br>BC11<br>BC13 | CC6 |
| Apply the international Conventions in force, Codes, resolutions and other international guides to carry out all the operations, related with the cargo, in a safe way | AJ12<br>AJ13<br>AJ14<br>AJ15 | BC2<br>BC5<br>BC11<br>BC13 | CC6 |
| A thorough knowledge* of the use and contents of the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods. | AJ20 | | |

| Contents | |
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| **Topic** | **Sub-topic** |
| Chap. 1. LIQUID HYDROCARBONS AND CHEMICAL PRODUCTS CARGO MEASUREMENT | Definitions<br>Calculations on board: American System, metric System and imperial or British System<br>Process of the measurement of the cargo on a oil tanker<br>Methods of taking ullages or soundings<br>Measurement equipment: manual equipment, electronic equipment (PEGD), automatic equipment.<br>High-level alarms and overflow systems<br>Methods of calculation of the quantity on board (OBQ) and remain on board edge (ROB): Liquid Material, Non-liquid material<br>Wedge formulae<br>Sounding and sampling in non-inerted tanks<br>Cargo Calculation in chemical tankers |

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| Chap. 2. LIQUEFIED GASES CARGO CALCULATION | Cargo calculations: introduction<br>Definitions and concepts: Ideal gas laws, Saturated Vapour Pressure, Physical properties of gas mixtures, Vapour pressure of gas mixtures, Temperature, Presssure, Heat<br>Measurement of cargo tank volumes. Measurement of densities.<br>Empirical calculation of the density of liquefied gas mixtures at a given temperature<br>Cargo Tank filling limits<br>Calculation procedures: Using standard temperature at 15ºC and using density tables<br>Determination of liquid LPG required for gassing up operations.<br>Determination of the Saturated Vapour Pressure of a mixture of gases at a given temperature.<br>Determination of atmosphere changes of a cargo tank and the rquired nitrogen or inert gas volume.<br>Properties of a LPG in saturated conditions |
| Chap. 3, DANGEROUS GOODS | The IMDG Code<br>Structure of the Dangerous Goods List<br>Clasification of Dangerous Goods: Class 1 to Class 9.<br>Identification of dangerous goods<br>Packing<br>Marking and placarding<br>Documentation<br>Stowage<br>Segregation |

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| Chap. 4. OIL TANKER OPERATIONS | Types of crude oils<br>Crude oil properties<br>Flammability classification of petroleum<br>Tank washing plan<br>Tank washing machines<br>Tank washing with water<br>Ballasting and deballasting cargo tanks<br>Slop tank operations<br>Purging and gas freeing<br>Rafting<br>Pumproom operations<br>Washing of cargo lines and pumps<br>Maintenance in cargo tanks and cargo tank deck areas<br>Voyage orders and cargo instructions<br>Loading Plan<br>The loading operation<br>Loading static accumulators oils<br>Load On Top<br>Maximum loading rate<br>Cargo tank venting during loading<br>Voc management plan and control technology<br>The loaded passage<br>The Discharge plan<br>What is COW?<br>COW methods<br>COW supply methods<br>Precautions when implementing the COW Plan<br>Discharge operations<br>Stripping systems<br>Contingencies and emergencies |
| Chap. 5. STOWAGE AND PLANNING OF SOLID BULK CARGOES TRANSPORT | Solid bulk cargoes transport regulations<br>IMSBC Code<br>Cargoes which may liquefy<br>Materials possessing chemical hazards<br>Trimming procedures<br>Cleaning and preparation of cargo holds<br>Procedures beforre arrival to the loading port<br>Operations at the loading port<br>Operations at the discharge port<br>Ship-shore safety checklists<br>Potential problems during cargo operations<br>Cargo distribution<br>Additional measures for bulk carriers<br>Structural limitations to consider when preparing a loading plan in a bulk carrier<br>Stowage planification of heavy density cargoes as iron ore or mineral concentrates<br>Cargo calculation<br>Segregation of different products in the same hold<br>Fumigation of ships and their cargo<br>The Silver Nitrate test |

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| Chap. 6. CARGO CALCULATIONS | Resolution of cargo exercises related with the programme: Cargo calculations in oil, chemical and LPG tankers; Cargo calculations in bulk carriers and combination carriers.<br>Stowage a securing of cargo on board as required by the CSS Code. |
| | Knowledge of and ability to apply relevant international<br>regulations, codes and standards concerning the safe<br>handling, stowage, securing and transport of cargoes<br>Knowledge of the effect on trim and stability of cargoes<br>and cargo operations Use of stability and trim diagrams and stress-calculating<br>equipment, including automatic data-based (ADB) equipment, and knowledge of<br>loading cargoes and<br>ballasting in order to keephull stress within acceptable<br>limits<br><br>Stowage and securing of cargoes on board ships, including cargo-handling gear and<br>securing and lashing equipment<br>Loading and unloading operations, with special<br>regard to the transport of cargoes identified in the Code<br>of Safe Practice for Cargo Stowage and Securing<br><br>General knowledge of tankers and tanker operations<br>Knowledge of the operational and design limitations of bulk<br>carriers Ability to use all available shipboard data related to<br>loading, care and unloading of bulk cargoes.<br>Ability to establish procedures for safe cargo handling in<br>accordance with the provisions of the relevant instruments<br>such as IMDG Code, IMSBC Code, MARPOL 73/78 Annexes III and V and other<br>relevant information<br>Ability to explain the basic principles for establishing<br>effective communications and improving working relationship between ship and<br>terminal personnel.<br>Knowledge of the limitations on strength of the vital constructional parts of a standard<br>bulk carrier and ability to interpret given figures for bending moments and shear forces<br><br>Ability to explain how to avoid the detrimental effects<br>on bulk carriers of corrosion, fatigue and inadequate cargo<br>handling.<br><br>International regulations, standards, codes and recommendations on the carriage of<br>dangerous cargoes, including the International Maritime Dangerous Goods (IMDG)<br>Code and the International Maritime Solid Bulk Cargoes<br>(IMSBC) Code<br>Carriage of dangerous, hazardous and harmful cargoes; precautions during loading<br>and unloading and care during the voyage.<br>A thorough knowledge of the use and contents of the<br>Medical First Aid Guide for Use in Accidents Involving Dangerous Goods. |
| | Conocimiento cabal del contenido y de la manera de utilizar la guía de primeros auxilios para uso en caso de accidentes relacionados con mercancías peligrosas |

| Planning |
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| Methodologies / tests | Competencies / Results | Teaching hours (in-person & virtual) | Student?s personal work hours | Total hours |
|---|---|---|---|---|
| Introductory activities | B11 | 1 | 0 | 1 |
| Guest lecture / keynote speech | A12 A13 A14 A15 A20 B2 | 25 | 37.5 | 62.5 |
| Case study | A12 A13 A14 A15 B2 B5 B11 B13 C6 | 25 | 37.5 | 62.5 |
| Objective test | A12 A13 A14 A15 A20 B2 | 6 | 6 | 12 |
| Summary | B12 C2 C10 | 6 | 0 | 6 |
| Personalized attention | | 6 | 0 | 6 |
| (*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students. | | | | |

| Methodologies | |
|---|---|
| Methodologies | Description |
| Introductory activities | The first class will be dedicated to the presentation of the subject to the students. |
| Guest lecture / keynote speech | General lectures of the different chapters the subject will be given. The student will have at his disposition bibliographic material and notes elaborated by the professor of the differents themes of the subjets for every lecture. The participation of the students will be promoted through comments related to the theoretical content and with experiences of the real life. |
| Case study | Application of the theory learnt in the lectures and resolution of practical exercises. |
| Objective test | The objective test will consist in a series of conceptual short questionsl, whose number will vary between 10 and 20, and the resolution of two practical exercises. The content of the questions will be similar to those given in the lectures and the practical exercises will be also similar to those resolved in the classroom. The student will have at his disposal sufficient material for the study of the theory and for the practical exercises. It may be possible to do partial tests of the theoretical part and of the practical exercises, and finally a joint final test of the complete subject. |
| Summary | Before each partial test and also before the final examination a general resumed lecture of the main contents exposed will be given. The intention is to help the student to understand the subject in a global way and to resolve those aspects that could give place to confusion or that were not assimilated properly. |

| Personalized attention | |
|---|---|
| Methodologies | Description |
| Summary<br>Case study | Further to the tutorship hours established for all the students of the subject, 6 addittional hours of customized tutorship are established to support and motivate those students that will require it. |

| Assessment | | | |
|---|---|---|---|
| Methodologies | Competencies / Results | Description | **Qualification** |
| Guest lecture / keynote speech | A12 A13 A14 A15 A20 B2 | The students will have the option to approve the subject during the term course providing always that he assisted to a least an 80% of the lectures in the classroom. The assistance to the lectures and the participation of the student, the resolution of the practical exercises and the continuous evaluation of the Professor may increse the final qualification with a 10%. Competencies: A12, A13, A14 and A15 | 5 |

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| Objective test | A12 A13 A14 A15 A20 B2 | The final qualification will be the average of the qualifications achieved in the partial tests and/or the final test. To surpass the subject is will necessary to obtain a 50% of weight in each part of the evaluation (Theoretical part (50%)and resolution of the practical exercises (50%).<br>Competencies: A12, A13, A14, A15 & A20. | 90 |
| Case study | A12 A13 A14 A15 B2 B5 B11 B13 C6 | The resolution of the practical exercises in the classroom may increase the final qualification with an additional 10%. Competencies A12,A13, A14 and A15. | 5 |
| Others | | | |

| Assessment comments |
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| Same criteria will be applied in the first and second opportunity (May and July)<br>Assessment criteria as included in the STCW Code Table A-II/2 and included in the Quality Guarantee System, to be applied when evaluating competence.<br>The students<br>with recognition of part-time dedication and academic waiver of attendance<br>exemption, as established by the "NORM THAT REGULATES THE REGIME OF<br>DEDICATION TO STUDY OF GRADE STUDENTS IN THE UDC (Arts. 2.3; 3.b; 4.3 and 7.5)<br>(Arts. 2.3; 3.b; 4.3 and 7.5) 05/04/2017) will be able to carry out the partial<br>tests, if necessary, without the need to attend 80% of the face-to-face<br>classes, as long as the professors are duly informed at the beginning of the<br>course. Furthermore, the professor may ask those students different research<br>works/problems along the school year to be expounded during tutoring hours. |

| Sources of information |
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| **Basic** | Apuntes del profesor ?Management & Control of Cargo Operations, 2020?Estiba de Cargas Sólidas, F. Louzán. Cartamar, A Coruña, 2016.Manual de buques Petroleros. F. Louzán, Cartamar, A Coruña, 2020. Código internacional para la construcción y el equipo de buques que transportes gases licuados a granel. OMI. Código IMDG, IMO 2020. Código IMSBC, IMO 2020. Código de prácticas de seguridad para la estiba y sujeción de la carga. IMO 2011. Código BLU: Código de prácticas de seguridad de las operaciones de carga y descarga de graneleros. IMO 2011. Código internacional para el transporte sin riesgo de grano a granel. IMO 1991. Código de prácticas de seguridad para buques que transporten cubertadas de madera, IMO 1992. Código de prácticas de seguridad para buques que transporten cubertadas de madera, IMO 2011. Manual de estiba de mercancías sólidas. Ricardo González Blanco, Ediciones UPC 2006 Tratado de estiba. Capt. J.B.Costa, Tercera edición, 2008. Cargo work. David J. House, Seventh edition, 2007. Thomas Stowage: The properties and stowage of cargoes, 8th edition. Brown, Son & Ferguson, Ltd. 2018. Tanker operations: A handbook for the Person-in-Charge, 4th edition. Mark Huber, Cornell Maritime Press, 2001. Liquefied gas handling principles on ships and in terminals, 3rd edition, McGuire and White, Witherby & Co Ltd. 2000. Bulk Carrier Practice, 2nd edition. Captain Jack Isbester. The Nautical Institute, London 2010. Bulk Carrier Notes. Abdul Khalique. Witherby Seamanship International, 2010. Cargo Notes. Dhananjay Swadi. Witherby Seamanship International, 2005. EL Bulk-carrier en la práctica. José Antonio Bustabad Rey. Urmo S.A. de Ediciones, Bilbao, 1980. Crude Oil Tanker Basics: The theory and practice of crude oil cargo operations. Captain Paul Armitage. Witherby Seamanship International, 2009. Stability, Trim and Strength for Merchant Ships and Fishing Vessels, second edition. Ian Clark. The Nautical Institute, 2006. Shipboard Petroleum Surveys: A Guide to Good Practice, second edition. Anthony Severn, North of England P&I Association, London 2009. Liquified Petroleum Gas Tanker Practice. Captain T.W.V. Woolcott. Brown, Son & Ferguson, Ltd., Glasgow 1977. Quantity Calculations LPG and Chemical Gases. D Beernaert, SIGTTO (The Society of International Gas Tanker and Terminal Operators) 1997. A Guide to Crude Oil Washing and Cargo Heating Criteria. INTERTANKO 2004. ISGOTT, International Safety Guide for Oil Tanker and Terminals, fifth edition. ICS, OCIMF & IAPH, Witherby & Co. Ltd., London 2006. Tanker Safety Guide: Liquefied Gas, second edition. International Chamber of Shipping, London 1995 |
| **Complementary** | |

| Recommendations |
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| **Subjects that it is recommended to have taken before** |
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| **Subjects that are recommended to be taken simultaneously** |
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| **Subjects that continue the syllabus** |
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| **Other comments** |
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**(*)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.**