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| **Country**  **RO** | **Institution**  **RNA** | **Course title**  **Naval Architecture** | **ECTS**  **3** |

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| Service  **Navy** | **Minimum Qualification for Lecturers**   * Bachelor/ master degree in Naval Electromechanics (for Navy) * Certified PhD instructor in hydrodynamics * English: Common European Framework of Reference for Languages (CEFR) Level B1 or NATO STANAG Level 1 | |
| Languages  **English** |
| **Prerequisites for international participants:**   * English: Common European Framework of Reference for Languages (CEFR) Level B1 or NATO STANAG Level 1. * Basic knowledge of IMO. | | **Goals of the Module:**   * Understanding the ship as a complex and unitary system * Knowledge and understanding of the concepts, models and methods underlying the assessment of the fundamental nautical qualities of the ship - buoyancy and transverse stability, as well as the parameters that influence these nautical qualities * Understanding the actions to be taken in case of partial loss of buoyancy of the ship, by flooding (partial or total) of a compartment or a group of compartments * Knowledge of the main structural elements of the ship's hull as well as the nomenclature specific to shipbuilding * Typical hull structures, construction and operating features of merchant ships * Understanding the fundamentals of the integrity and tightness of the hull |

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| Learning outcomes | Knowledge | * Acquisition of knowledge on main structural elements of the ship's hull * Acquisition of knowledge on buoyancy and transverse stability * Acquisition of knowledge on hull structures |
| **Skills** | * Demonstrate and apply a rigorous, efficient, and responsible attitude towards solving stability problems. * Develop the capacity necessary to make the most appropriate decisions for solving complex situations at sea. * Develop the capacity to react effectively in dangerous situations and to take specific measures in flooding (partial or total) |
| **Competence** | * The student can describe fundamental theoretical bases regarding the principles of ship stability. * The student can decide based on scenario provided in flooding (partial or total). * The student can describe and use ship stability. * Formation of a clear conception regarding the contribution of the specific competences of the discipline, in the general framework of the operation of the ship * Imposing a rigorous and responsible approach to discipline-specific issues and awareness of the subordination of results and methods to specific international regulations |

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| **Verification of learning outcomes**   * **Observation**:   + The theoretical part will be discussed and included in solving stability problems in classroom. * **Tests**:   + The assessment of capability of solving buoyancyand transverse stability exercises * **Evaluation**:   + The exam will include buoyancyand transverse stability exercises. Participants will be asked to create decisions based on scenario provided.   + Qualified individual feedback will be provided to each participant. |

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| **Module details** | | |
| **Main Topic** | **Recom-mended**  **WH** | **Details** |
| **Introductory concepts** | 4 | Scurt istoric al navigaţiei şi al construcţiilor navale, reguli şi Regulamente, conexiuni inter- disciplinare, calităţi nautice) |
| **Ship geometry** | 2 | Nomenclatura specifică construcţiilor navale, sistemul de axe, plane principale, dimensiuni principale, rapoarte intre dimensiuni, coeficienţi de fineţe) |
| **Buoyancy** | 4 | Floating parameters, forces acting on the ship, equilibrium conditions, weight of the ship, coordinates of the center of gravity, groups of masses that make up the ship's displacement, calculation of hydrostatic elements of the hull and their variation curves with draft, straight hull diagram, calculation of inclined hulls, Bonjean diagram, trim chart, influence of embarkation and mass landing on board on the buoyancy of the ship, unit displacement (TPC), buoyancy reserve)  Exercises for these topics. |
| **Initial stability of the ship intact** | 4 | Mechanism of creation of the moment of stability, disturbing forces, metacentric height, metacentric formula of stability, unit moment of transverse tilt and unit moment of trim (MCTC), influences on the position and stability of the ship in cases: mass movement on board, embarkation and disembarkation of masses, suspended masses, liquid-free surfaces, stability test, standardization of initial stability)  Exercises for these topics. |
| **Stability at high tilt angles of the ship intact** | 4 | Metacentric radius, hull center and metacenter center coordinates during tilt, static ship stability, static stability arm, ship dynamic stability, dynamic stability arm, stability charts, properties, practical problems that arise during ship operation and are solved using stability diagrams, influences on stability diagrams, hull diagram, stability standardization, global ship safety concept, stability documentation for intact ship) |
| **Buoyancy and stability of the damaged ship** | 4 | General, classification of flooded compartments, extent and location of damage, fundamental effects of damage, methods of calculating the buoyancy and stability of the damaged ship) |
| **Nomenclature and hull structure** | 2 | Basics, classification of civilian ships, draft ladders, classification societies, main parts of the hull structure, framing systems, superstructures and rudders, special tanks and fuel tanks, parapet, railings, straw, tree line tunnel, openings in decks and in the outer shell, bow and stern) |
| **Final evaluation** | 4 | The final assessment consists in solving buoyancyand transverse stability exercises. |
| **Total lecture WH** | **28** |  |
| **Additional hours (WH) to increase the learning outcomes** | | |
| Self-Study | 22 | **References:**  1. Pricop M., Chiţac V., Oncica V., Teoria şi construcţia navei –Noţiuni teoretice şi probleme, Editura Academiei Navale „Mircea cel Bătrân”, 2009.  2. Maier V. Mecanica şi construcţia navei, Vol. I Statica navei, Editura Tehnică, Bucureşti, 1985.  3. AUTOSHIP Users Guide 9.1, 2011  4. AUTOHYDRO User’s Manual 6.5, 2011  5. AUTOPOWER User’s Guide 3.1, 2007 |
| **Total WH** | **50** | 28 residential hrs (16 teaching hrs + 8 exercises + 4 final assessment);  22 self-study. |

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| **List of Abbreviations:** |
| RO………………………………………………………………………………………Romania  RNA……………..…………………………..…Romanian Naval Academy “Mircea cel Bătrân”  ECTS……………………………………...European Credit Transfer and Accumulation System  STANAG…………………………………………………………....Standardization Agreement  IMO…………………………………………………….….. International Maritime Organization |