

Country RO	Institution RNA	Common Module Naval Architecture	ECTS 2.0
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Service(s): Navy	<p align="center">Minimum Qualification of Instructors:</p> <ul style="list-style-type: none"> Bachelor/ master degree in Nautical Sciences or Naval Electromechanics. Certified instructor in hydrodynamics or PhD degree holder. English: Common European Framework of Reference for Languages (CEFR) Level B1 or NATO STANAG Level 2+.
Language: English	
SQF MILOF:	

<p>Prerequisites for participants:</p> <ul style="list-style-type: none"> English: Common European Framework of Reference for Languages (CEFR) Level B1 or NATO STANAG Level 2. Basic knowledge of IMO. 	<p>Contents of the Module:</p> <ul style="list-style-type: none"> 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. The main structural elements of the ship's hull as well as the nomenclature specific to shipbuilding, integrity and tightness of the hull. Effective actions in case of loss of buoyancy of the ship.
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Learning outcomes	Know-ledge	<ul style="list-style-type: none"> Formulate the basics of geometry, static and dynamic laws of the ship. Perform a review of shipbuilding elements and the main shipbuilding methods.
	Skills	<ul style="list-style-type: none"> Apply correctly the studied ship geometry, ship forms, ship's hull longitudinal strength to ship buoyancy, intact and damaged ship stability. Understand and correctly apply sea-keeping concepts and principles, ship's documents and diagrams referring to hydrodynamics and ship stability.
	Respon-sibility & Autonomy	<ul style="list-style-type: none"> Demonstrate autonomous judgment and accountability by interpreting ship stability documentation/diagrams, documenting results and rationale, communicating risk-relevant findings and recommending actions to the chain of command in order to independently solve operational problems related to buoyancy, intact/damaged stability, resistance to advancement, and ship behaviour, using standard calculus. Assume responsibility for stability-impact decisions by selecting and justifying corrective measures when stability varies due to cargo operations or flooding scenarios, within defined operational procedures.

<p>Verification of learning outcomes:</p> <ul style="list-style-type: none"> Observation: The theoretical part will be discussed and included in solving stability problems conducted during the practical activities using the calculus and dedicated software (during the seminar and laboratory classes). Tests: The final test will comprise problem-solving exercises to evaluate the course participants' knowledge and ability to solve buoyancy and transverse stability problems using calculus and dedicated software. Evaluation: The exam will consist of buoyancy and transverse stability exercises conducted on a written test by using the calculus and dedicated software. The course participants will be asked to issue justified decisions based on provided scenario. Qualified individual feedback will be provided to each participant.

Module details:

Main Topic	Recommended WH for the residential phase	Details
Introductory concepts.	4	<ul style="list-style-type: none"> Short history of shipbuilding evolution, ship construction rules and regulations, nautical features.
Ship geometry.	2	<ul style="list-style-type: none"> Shipbuilding terminology, system of axes, main planes, main dimensions, ratios between dimensions, fineness ratio.
Buoyancy.	2	<ul style="list-style-type: none"> Floating parameters, forces acting on the ship, equilibrium conditions, weight of the ship, coordinates of the centre 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	<ul style="list-style-type: none"> 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, standardisation of initial stability) Applied exercises.
Stability at high tilt angles of the ship intact.	4	<ul style="list-style-type: none"> Metacentric radius, hull centre and metacentre 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 standardisation, global ship safety concept, stability documentation for intact ship.
Buoyancy and stability of the damaged ship.	4	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.
Total WH (contact hours)	22	
Additional hours (WH) to increase and assess the learning outcomes (during residential phase):		
Self-studies	25	<ul style="list-style-type: none"> 1. AUTOSHIP Users Guide 9.1, 2011 2. AUTOHYDRO User's Manual 6.5, 2011 3. AUTOPOWER User's Guide 3.1, 2007 4. Manea Greti (coord.), Naval Architecture, INS Manual, Naval Academy Publishing House, Constanta, 2025.
Test / evaluation / assessment	3	<ul style="list-style-type: none"> The final assessment consists in solving buoyancy and transverse stability exercises.
Total WH	50	The detailed amount of hours for the respective main topic is up to the course director according to national law or home institution's rules.



List of Abbreviations:

B1, C1	CEFR Levels
BIP	Blended Intensive Programme
CEFR	Common European Framework of Reference for Languages
ECTS	European Credit Transfer and Accumulation System
ESDC	European Security and Defence College
IG	Implementation Group
IMO	International Maritime Organisation
NATO	North Atlantic Treaty Organization
RNA	Romanian Naval Academy "Mircea cel Bătrân"
RO	Romania
STANAG	Standardisation Agreement
WH	Working Hour (60 minutes)