



<b>Implementation Group</b>	
<b>Doc.:</b>	ESDC/2026/106
<b>Date:</b>	18/02/2026
<b>Origin:</b>	ESDC Secretariat

Country <b>PL</b>	Institution <b>PNA</b>	Common Module <b>Computer Networks</b>	<b>ECTS</b> <b>2.0</b>
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<b>Service(s):</b> <b>Navy</b>	<p><b>Minimum Qualification of Instructors:</b></p> <ul style="list-style-type: none"> <li>• PhD degree in Communications/Computer sciences/ Engineering.</li> <li>• English: Common European Framework of Reference for Languages (CEFR) Level B1 or NATO STANAG Level 2.</li> </ul>
<b>Language:</b> <b>English</b>	
<b>SQF</b> <b>MILOF:</b>	<ul style="list-style-type: none"> <li>• <b>Competence area</b> – Military technician.</li> <li>• <b>Learning area</b> – Employment of weapon/ operating platform/ systems.</li> <li>• <b>Organisational level</b> – Single Arm/Branch.</li> </ul>

<p><b>Prerequisites for participants:</b></p> <ul style="list-style-type: none"> <li>• English: Common European Framework of Reference for Languages (CEFR) Level B1 or NATO STANAG Level 2.</li> <li>• Minimal knowledge of electronic physics and communications.</li> </ul>	<p><b>Contents of the Module:</b></p> <ul style="list-style-type: none"> <li>• The principles of operation and design of computer networks.</li> <li>• Concepts, techniques and protocols of information management in the networks.</li> <li>• Basic computer networks used in the naval environment.</li> </ul>
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<b>Learning outcomes</b>	Know- ledge	<ul style="list-style-type: none"> <li>• Formulate the basics of computer networks.</li> <li>• Describe and distinguish the operating principles of the on-board computer networks.</li> </ul>
	Skills	<ul style="list-style-type: none"> <li>• Interpret the physic phenomena of computer networks functionalities.</li> <li>• Conduct software set up checks for functionality control.</li> </ul>
	Respon- sibility & Autonomy	<ul style="list-style-type: none"> <li>• Operate independently based on onboard/naval computer network components and services (e.g., OSI/TCP-IP functions, Ethernet/LAN segments).</li> <li>• Apply autonomous judgment to support secure network operation (e.g., basic VPN usage and protocol-level hygiene), complying with onboard cybersecurity guidance and minimising operational risk while executing assigned tasks.</li> </ul>

<p><b>Verification of learning outcomes:</b></p> <ul style="list-style-type: none"> <li>• <b>Observation:</b> the theoretical part will be uploaded on the portal of the organising institution to facilitate the individual study as required. Also; the simulation programs (except ADS) for which a special license will be given will be provided on the residential courses, at the organising institution's responsibility.</li> <li>• <b>Tests:</b> the assessment strategy is based on a pre-post assessment method and a personal interview in laboratory premises.</li> <li>• <b>Evaluation:</b> the observation and the practical applications conducted during the course will be considered as results in the overall grading of the module. Qualified individual feedback will be provided to participants.</li> </ul>
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## Module details:

Main Topic	Recom- mended WH <small>for the residential phase</small>	Details
Computer networks Introduction.	4	<ul style="list-style-type: none"> <li>The OSI reference model.</li> <li>The TCP/IP implementation.</li> <li>Protocols and services.</li> </ul>
Introduction to telephone networks.	4	<ul style="list-style-type: none"> <li>PSTN.</li> <li>DSL.</li> <li>Circuit switching.</li> <li>Message switching.</li> <li>Packet switching.</li> <li>Multiplexing.</li> </ul>
The TCP/IP Stack.	4	<ul style="list-style-type: none"> <li>The host-to-network layer.</li> <li>The MAC sublayer.</li> <li>The Internet layer.</li> <li>The transport layer.</li> <li>The application layer.</li> </ul>
Ethernet.	4	<ul style="list-style-type: none"> <li>LAN/MAN/WAN.</li> <li>Cabling.</li> </ul>
Internet protocols.	4	<ul style="list-style-type: none"> <li>ICMP.</li> <li>ARP.</li> <li>DHCP.</li> <li>DNS.</li> <li>TCP vs UDP.</li> </ul>
Virtual Private Networks.	4	<ul style="list-style-type: none"> <li>OpenVPN.</li> </ul>
<b>Total WH</b> <small>(contact hours)</small>	<b>24</b>	
<b>Additional hours (WH) to increase and assess the learning outcomes (during residential phase):</b>		
Self-studies	26	<ul style="list-style-type: none"> <li>The EU guidelines on computer networks administration.</li> <li>The guidelines on cyber security onboard ships.</li> <li>Protect EU - European Union Security Strategy (<a href="https://home-affairs.ec.europa.eu/policies/internal-security_en">https://home-affairs.ec.europa.eu/policies/internal-security_en</a>).</li> <li>European Union Cyber Security Strategy</li> <li>EU Cyber Security Strategy for the Digital Decade (<a href="https://digital-strategy.ec.europa.eu/en/library/eus-cybersecurity-strategy-digital-decade-0">https://digital-strategy.ec.europa.eu/en/library/eus-cybersecurity-strategy-digital-decade-0</a>).</li> </ul>
<b>Total WH</b>	<b>50</b>	The detailed amount of hours for the respective main topic is up to the course director according to national law or the home institution's rules.



## List of Abbreviations:

B1, B2, 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
IT/OT .....	Information Technology/Operational Technology
NATO .....	North Atlantic Treaty Organization
PL .....	Republic of Poland
PNA .....	Polish Naval Academy
STANAG .....	Standardisation Agreement
VA&PT reports .....	Vulnerability Assessment and Penetration Testing reports
WH .....	Working Hour (60 minutes)