

Country <b>IT</b>	Institution <b>IT-SAMS and University of Turin</b>	Common Module <b>Problem Solving and Critical Thinking</b>	<b>ECTS 2.0 (+ 1.0 e-learning)</b>
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<b>Minimum Qualification for Lecturers</b>	
Service <b>All</b>	<ul style="list-style-type: none"> <li><b>Officers:</b> <ul style="list-style-type: none"> <li>English: Common European Framework of Reference for Languages (CEFR) Level B2 or NATO STANAG Level 3,</li> <li>Expertise on the topics.</li> </ul> </li> </ul>
Language <b>English</b>	<ul style="list-style-type: none"> <li><b>Civilians:</b> <ul style="list-style-type: none"> <li>English: Common European Framework of Reference for Languages (CEFR) Level B2 or NATO STANAG Level 3,</li> <li>Expertise on relevant topics,</li> <li>Relevant academic publications.</li> </ul> </li> </ul>

<p><b>Prerequisites for international 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>Basic knowledge of calculus</li> <li>Basic knowledge of descriptive statistics</li> </ul>	<p><b>Goals of the Module</b> Models for the resolution of problem in social, economic and logistic contexts.</p>
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<b>Learning outcomes</b>	Know- ledge	<ul style="list-style-type: none"> <li>Formulate problems coming from real situation.</li> <li>Describe and distinguish different kind of data.</li> </ul>
	Skills	<ul style="list-style-type: none"> <li>Develops creative strategies and procedures in order to solve problems.</li> <li>Deals and discusses critically proposed solutions.</li> </ul>
	Responsibility and autonomy	<ul style="list-style-type: none"> <li>Find solutions for real-world problems.</li> <li>Evaluate the consistency of proposed solutions and make decisions critically.</li> </ul>

<b>Evaluation of learning outcomes</b>	
<ul style="list-style-type: none"> <li><b>Observation:</b> Throughout the Module students are to be observed and evaluated on their understanding to allow for remedial action if needed.</li> <li><b>Discussion:</b> Throughout the Module students are to discuss given topics in syndicates and in the plenary to allow for reflexions and in-depth understanding.</li> <li><b>Test:</b> Written tests during the e-learning phase and at the (beginning) end of the Module.</li> </ul>	

Module Details			
Topic	Resi- dential	E- learning	Details
Introduction to problem solving and critical thinking	2	1	<ul style="list-style-type: none"> <li>Definition of problem solving.</li> <li>Definition of critical thinking.</li> <li>Applications in defence and security contexts.</li> </ul>
Basic Mathematics Knowledge	-	4	<ul style="list-style-type: none"> <li>Calculus (elementary functions, their properties and graphics, derivatives)</li> <li>Elements of combinatorics</li> <li>Statistic indices</li> </ul>
Shifts and codes	2	1	<ul style="list-style-type: none"> <li>Applications of permutations and combinations in security and defence contexts.</li> </ul>
Reading data	2	1	<ul style="list-style-type: none"> <li>Statics indices to read and interpret data and reports</li> </ul>
Dynamic models	2	1	<ul style="list-style-type: none"> <li>Analysis of examples of dynamic models in security and defence contexts.</li> </ul>
Strategic games	2	1	<ul style="list-style-type: none"> <li>Deterministic games in security and defence contexts.</li> </ul>
Optimization problems	2		<ul style="list-style-type: none"> <li>Guideline for solving optimization problems.</li> <li>Examples: maximization and minimization in different contexts.</li> <li>Discussion of the solutions.</li> </ul>
Working group	10		<ul style="list-style-type: none"> <li>Problem solving and critical thinking activities on real-world problems.</li> <li>Team building for problem solving activities.</li> <li>Collaborative learning to find resolute strategies.</li> </ul>
Presentations and discussions	2		<ul style="list-style-type: none"> <li>Presentation of results and discussion.</li> </ul>
Total lectures and e-learning lessons	24	10	<ul style="list-style-type: none"> <li>In case of a 3 ECTS PSCT CM Version (BIP) it is required 1/3 of lectures is via e-learning. The selection of e-learning topics is up to the Course Director.</li> </ul>
Self-Studies	26	15	<ul style="list-style-type: none"> <li>Preparation for the upcoming lessons and for exam(s).</li> <li>Reflection of the topics issued.</li> <li>E-learning self-studies is also counted.</li> </ul>
<b>Total</b>	<b>50 2 ECTS</b>	<b>25 1 ECTS</b>	<p>The total amount of hours depends on the selected version (2 or 3 ECTS) and it is up to the course director according to national law or home institution's rules.</p> <p>The Course Director is invited to integrate in the module some syndicate works in order to emphasize the team working.</p>

## List of Abbreviations:

B1, B2 .....	Common Reference Levels
BIP .....	Blended Intensive Programme
CEFR .....	Common European Framework of Reference for Languages
CM .....	Common Module
ECTS .....	European Credit Transfer and Accumulation System
ESDC .....	European Security and Defence College
IG .....	Implementation Group
IT-SAMS .....	Italian Army Education and Training Command and School of Applied Military Studies
LoD .....	Line of Development
NATO .....	North Atlantic Treaty Organization
PSCT .....	Problem Solving and Critical Thinking
STANAG .....	Standardization Agreement
WH .....	Working Hour