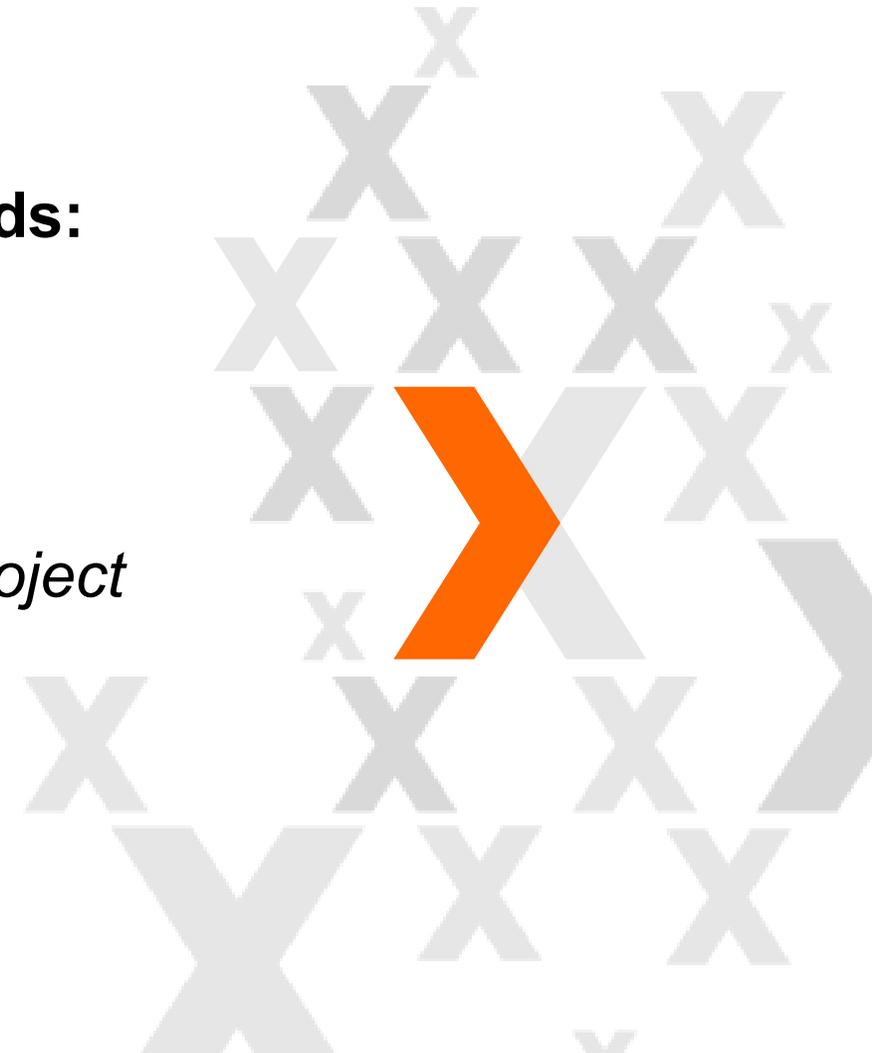


Systems Engineering Education in the Netherlands:

Bridging the Industry-Academia Gap

Insights from the NXT GEN Systems Engineering Project



What is the challenge?



Industry Reality in SE

Complex, multi-disciplinary projects requiring systems engineers who can navigate stakeholder dynamics, manage risks, and lead initiatives from day one



Educational Gap

Traditional curricula may not fully align with the practical systems engineering skills and leadership capabilities demanded by modern industry.



Growing Complexity

Technological advancement and system integration challenges require systems engineers with broader skillsets and adaptability.



Continuous Evolution

Rapid industry changes demand flexible, lifelong learning approaches rather than static educational models.

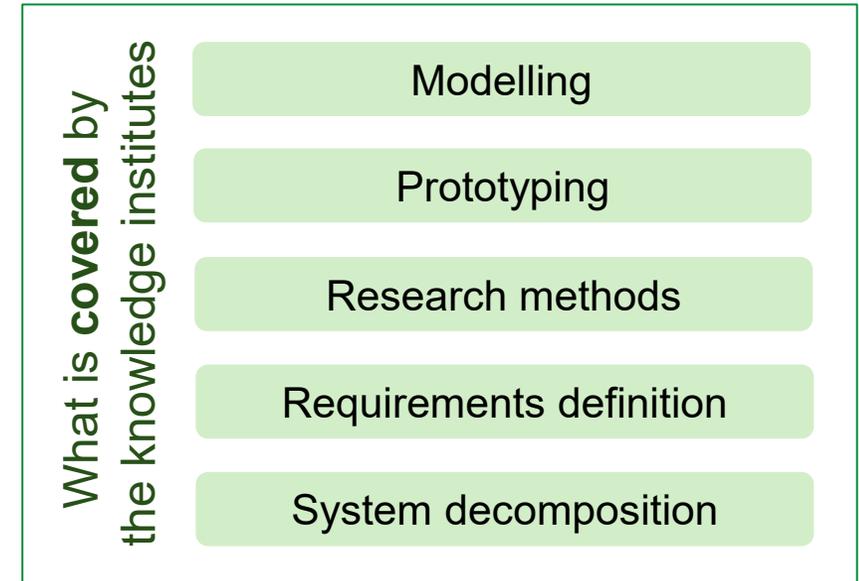
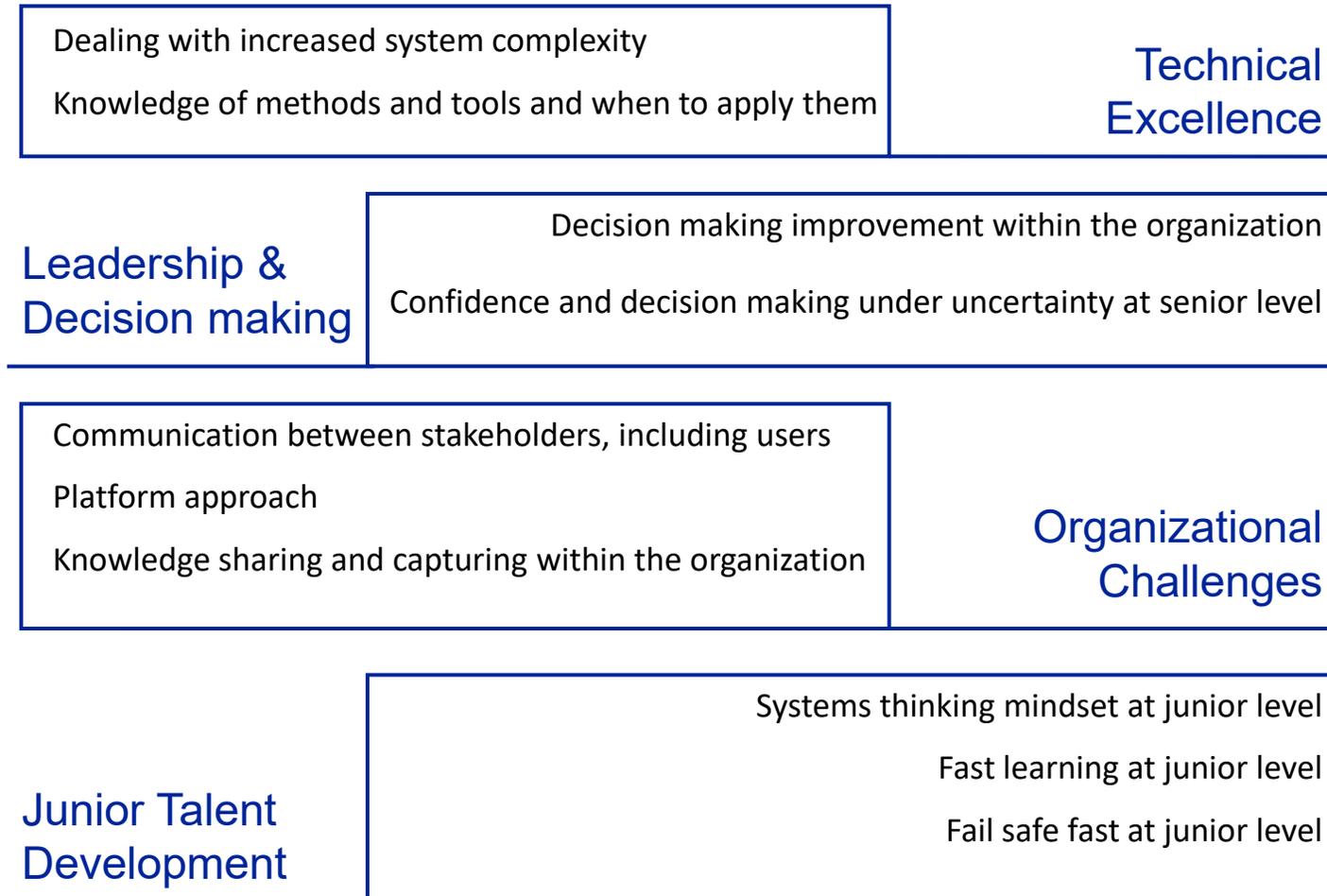
NXT GEN SE Three Phased Systematic Approach



NXT GEN Systems Engineering Project: understanding of the current state, industry needs, and future educational requirements for Dutch SE professionals.



What is the ~~over~~ industry asking for programs graduates?



INCOSE Competency Framework

Core competencies:

Covers core principles which underpin engineering/ systems engineering.

Systems Thinking
Lifecycles
Capability Engineering
General Engineering
Critical Thinking
Systems Modelling
and Analysis

Professional competencies:

Covers behavioral competencies.

Communications
Ethics and Professionalism
Technical Leadership
Negotiation
Team Dynamics
Facilitation
Emotional Intelligence
Coaching and Mentoring

Management competencies:

Covers the competencies associated with controlling and managing systems engineering work.

Planning
Monitoring and Control
Decision Management
Concurrent Engineering
Business and Enterprise
Integration
Acquisition and Supply
Information Management
Configuration Management
Risk and Opportunity Mng

Technical competencies:

Covers the competencies related Technical Processes identified in the INCOSE SE Handbook 4th Edition.

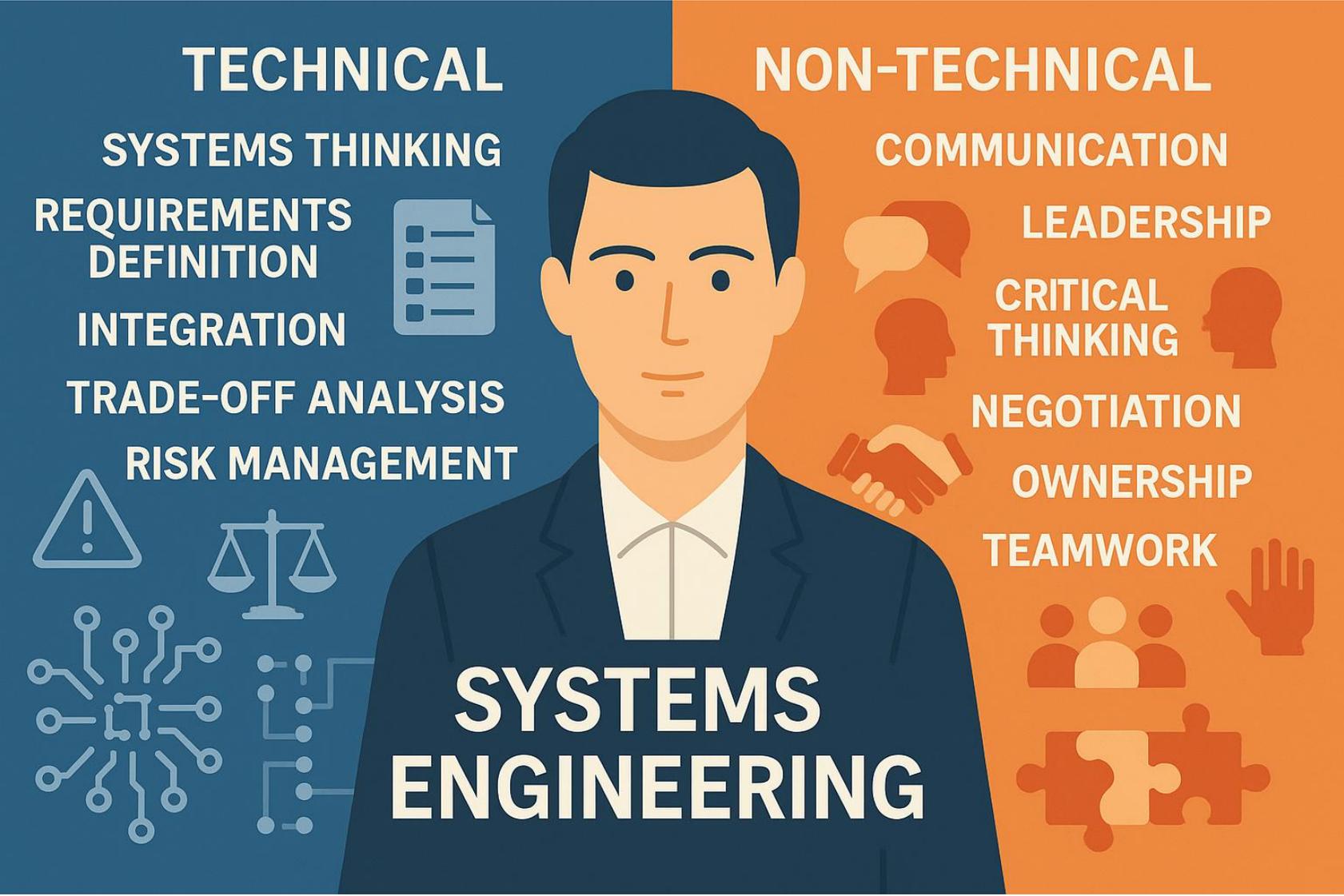
Requirements Definition
System Architecting
Design for...
Integration
Interfaces
Verification
Validation
Transition
Operation and Support

Integrating competencies:

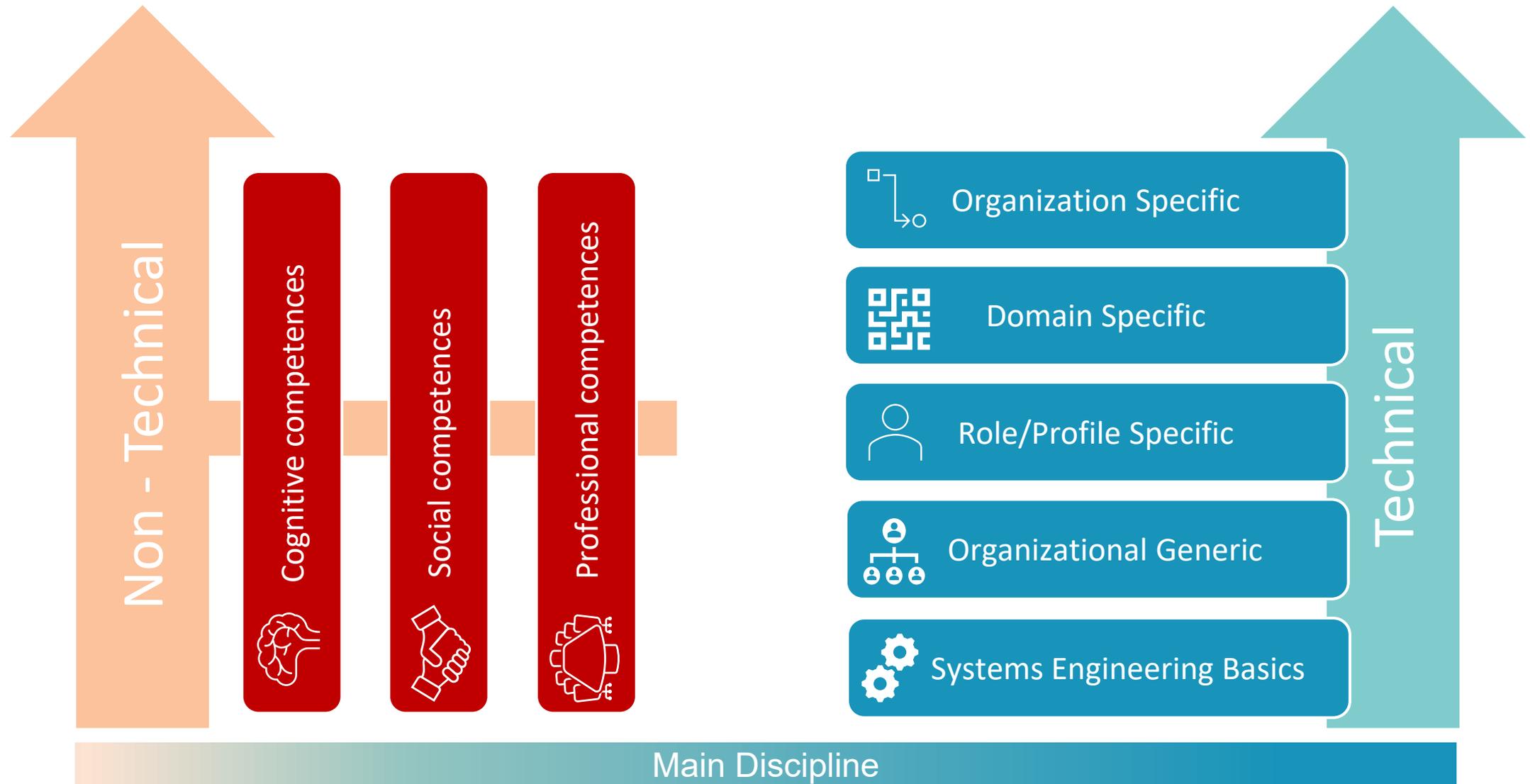
Covers the systems engineering competencies required to integrating perspectives into the overall picture.

Project Management
Finance
Logistics
Quality

Future Systems Engineering Education



Systems Engineering Educational Framework



Intended Learning Outcomes for Systems Engineering*

BSc Level – Under Supervision

Explain and apply the **systems engineering fundamentals**.

Analyze **design trade-offs** and use quantitative data to support **design decisions**.

Use **logical reasoning** to **break apart system problems**, understand data, and reach evidence-based conclusions.

Communicate effectively to both technical and non-technical **stakeholders**

Analyze the **ethical, societal, and environmental** implications of systems engineering decisions.

MSc Level – Minimum or No Supervision

Apply **advanced systems engineering methods** to solve novel, **complex problems in real-world contexts**

Critically reflect on theories, models, and methods in systems engineering, and construct **well-founded arguments** in scientific and professional discourse.

Collaborate in interdisciplinary teams to plan and execute a complex systems design project that addresses real societal challenges

Make well-justified professional **decisions in ambiguous or conflicting situations**

Key takeaways



The Gap is Real and Significant

Non – Technical Skills are Critical.

The Framework provides Roadmap

Education Must Transform



nxtgenhightech.nl

Tot ziens