



## COURSE SYLLABUS

# Human-System Integration, 7.5 credits

*Human-System Integration, 7,5 högskolepoäng*

---

<b>Course Code:</b> TS4R23	<b>Education Cycle:</b> Second-cycle level
<b>Confirmed by:</b> Dean Jun 1, 2022	<b>Disciplinary domain:</b> Technology
<b>Valid From:</b> Jan 1, 2023	<b>Subject group:</b> AE1
<b>Version:</b> 1	<b>Specialised in:</b> A1N

---

### Intended Learning Outcomes (ILO)

After a successful course, the student shall;

Knowledge and understanding

- display knowledge of human-centred design approaches for industrial complex systems
- display knowledge of resilience engineering concepts
- display knowledge of the dynamics of making a change to a complex system

Skills and abilities

- demonstrate the ability to independently design and develop systemic integration models for complex interactions
- demonstrate the ability to articulate the mutually dependent set of priorities, perspectives, and practices that an organisation needs to carry out
- demonstrate the ability to analyse how work activities take place either retrospectively or prospectively

Judgement and approach

- demonstrate the ability to assess variability in socio-technical systems. including patterns of human-systems performance
- demonstrate the ability to assess the state of resilience in connection with organizational performance

### Contents

The course provides knowledge and insights about the role of humans and organizations in the design of complex systems, regarding new technologies, people and organizations that are or will be using them, with the central issue of coordination of autonomous (or semiautonomous) agents. This also includes methods and tools to enable moving from rigid automation to flexible autonomy.

The course includes the following elements:

- Emergent functions and structures within an active system of systems
- Resilience and state-space transitions

- Work as Imagined versus Work as Actually Done
- Synthetic change management
- Functional Resonance Analysis Method
- Organization-driven and Human-driven Flexibility of Sociotechnical systems
- Multi-agent co-adaptive systems

### Type of instruction

The teaching consists of lectures, seminars and exercises performed individually and in groups.

The teaching is conducted in English.

### Prerequisites

Passed courses of at least 40 credits in the main field of study, Technology/Natural Science, and at least 2 years of work experience (or the equivalent). Applicants with an academic degree of at least 180 credits within a technical/scientific field are exempt from the work experience requirement.

### Examination and grades

The course is graded 5,4,3 or Fail.

The final grade for the course is based on the grade of the seminars. The final grade will only be issued after satisfactory completion of all assessments.

Registration of examination:

Name of the Test	Value	Grading
Seminars <sup>1</sup>	5 credits	5/4/3/U
Project	2.5 credits	U/G

<sup>1</sup> Determines the final grade of the course, which is issued only when all course units have been passed.

### Course literature

The literature list for the course will be provided 8 weeks before the course starts.

Boy, Guy André. Human–systems integration: from virtual to tangible. CRC Press, 2020.

Hollnagel, Erik. Synesis: The Unification of Productivity, Quality, Safety and Reliability. Routledge, 2021.

Literature available in digital format from Primo (JU library system)