

MSc Industry Transformation Management Human Systems Integration

COURSE CODE - 30 hours elective Course

ECTS Credits: 2
Period: March 13-17, 2023
Campus: CentraleSupélec
Audience: Master
Language: English

Prerequisite: none

Department: FlexTech Chair, Industrial Engineering Laboratory, CentraleSupélec

Professor: Prof. Dr. Guy André Boy, office N° sb.214 Bouygues building
Phone: +33 6 73 11 79 38 Email: guy-andre.boy@centralesupelec.fr.

I. INTRODUCTION

This course is designed for Master of Science students who want to know more about the role, responsibility, and degrees of involvement of people in highly interconnected socio-technical complex environments. It has a strong systemic focus on the way technology, organizations and people interact among each other. *The uniqueness of this course is that it includes a hands-on human-centered design (HCD) approach to human systems integration (HSI) that allows the student to be immersed with international experts in a variety of complex interconnected socio-technical environments. In a blended format, the innovative content of the participatory design and management approach will be complemented by issue reviews, discussions, and debates to further develop student's sociotechnical human-centered design and management skills and company case studies to develop students' sociotechnical skills. The overall goal is to learn about and experience HSI design and management contemporary issues.*

II. LEARNING OBJECTIVES of the course

The objectives of the course are to:

- strengthen students' understanding of the need and actual possibilities of human systems integration (HSI) in interconnected sociotechnical complex environments;
- structure the students' understanding of what it requires to integrate technology, organizations and people to enhance safety, efficiency and comfort;
- make students aware of the impact of HSI methods and tools on the design and management of interconnected sociotechnical complex systems;
- provide students with HSI skills as well as insights in practices in interconnected sociotechnical organizations.

III. LEARNING OUTCOMES of the course

Knowledge and understanding:

At the end of the course, students should be able to:

- analyze the impact of various HSI scenarios and configurations on the design and management of interconnected sociotechnical complex systems;
- understand the various ways HSI practices can influence complexity, maturity, flexibility, stability, and sustainability of interconnected sociotechnical complex systems;
- understand the use of HSI methods and tools in industry transformation management.

Skills:

At the end of the course, students should have developed:

- HSI managerial skills;
- a human-centered attitude vis-à-vis technology innovation and development.

Values and attitudes:

At the end of the course, students should have developed:

- a positive appreciation of HSI requirements;
- a positive appreciation of human-centered solutions in technology development.

IV. CONTENT

The human-centered design and management approach must be prepared at home prior to class (appr. 6 hours) on a use-case with which the student should become familiar (e.g., health system transformation, oil-and-gas platform management transformation, banking system change management). A typical session is very interactive and includes lecturing, in-class assignments, group work, discussions.

- **Introduction**
- **Foundations of Human Systems Integration**
- **Concepts of Cognitive Engineering (single-agent and multi-agent)**
- **Organization Design and Management**
- **Complexity Analysis**
- **Ethnographical Design**
- **Scenario-Based Design**
- **Risk-Taking, Prevention and Design**

V. TEACHING METHODS

Delivery modes:

- 100% face to face 100% face to face/teaching materials on Blackboard Blended 100% online

Teaching Methods:

- Lectures Case studies Business Games Group Work Projects Tutorials

Knowledge acquisition:

- Participatory and scenario-based Design
- Group work /Lecturing
- Interactive Sessions
- Readings

Skills acquisition:

- Human-Centered Design for Human Systems Integration
- Group Work/Lecturing
- Interactive Sessions

VI. ASSESSMENT METHODS AND FEEDBACK

Assessment component	Assessment type	Weighting	Minimum qualifying mark	Pass/Fail?
	Exam related to human-centered design toward human systems integration (individual)	70 %	10/20	YES / NO
	Group presentations (group)	30 %	10/20	YES / NO
	Oral participation (individual)	Bonus		

Assessment criteria

Candidates will be assessed on their understanding of the material covered in the module and their ability to apply it to a given set of facts. Therefore, we look at

- Application of knowledge
- Use of skills in interactive sessions

Feedback on assessment

- Automatic feedback in the context of the HSI participatory design approach taught
- Feedback for group work

Assessment Regulations

The Pass mark for the module is 50%. Any minimum qualifying marks for specific assessments are listed in the table above. The weighting of the different components can also be found above. The Programme Specification contains information on what happens if you fail an assessment component or the module.

Students are required to attend all class sessions. In exceptional cases, they may miss up to one session, provided they send an excuse to the professor by e-mail before the beginning of the course. In case of repeated absence or lateness, the professor may deduct points for non-participation from the final grade.

VII. REFERENCE BOOKS

- Insights related to the HSI (will be provided before the course)
- Other course materials: Handout (slides), exercises, case studies (will be provided during the course)

Recommended readings

Boy, G.A. & Quillerou, E. (2022). Risk-Taking, Prevention and Design: A Cross-Fertilization Approach. CRC Press, Taylor & Francis, USA.

Boy, G.A. (2021). Design for Flexibility - A Human Systems Integration Approach. Springer Nature, Switzerland. ISBN: 978-3-030-76391-6.

Boy, G.A. (2020). *Human Systems Integration: From Virtual to Tangible*. CRC Press – Taylor & Francis Group, USA (<https://www.taylorfrancis.com/books/9780429351686>).

Boy, G.A. (2013). *Orchestrating Human-Centered Design*. Springer, U.K. (<http://www.springer.com/gp/book/9781447143383>)