

HF1 – Human Factors and Neuroergonomics for Aeronautics & Transportation

From the Advanced Master TAS Aero (Aeronautical Engineering)



Highlights

- Unique Neuroergonomics course
- Seminars with pilots, industrialists, ergonomists
- Use of neuroimaging tools & light planes

The objective of this course is to provide learners with a high-level multi-disciplinary approach to understand human behavior and performance. This course encompasses a thorough training on the use of the five main physiological sensors dedicated to measure human performance and mental activity. It emphasizes on practical work using the ISAE flight simulators and real light aircrafts to assess the pilots' brain activity.

Prerequisites

- Master level

Key elements

Dates: 16 Nov 2020 – 1 Apr 2021

Duration: 100 hours

For whom:

Recent graduates, jobseekers and experienced employees

Location:

ISAE-SUPAERO, Toulouse

Course fees: 6 500 €

Language: English

Learning objectives

After completing this course, participants will be able to:

- Understand the psychological and biological processes that underlie human performance & mental states
- Be able to analyze a work activity with Cognitive Ergonomics tools
- Record and analyze physiological data on human operators
- Be able to assess operators' cognitive state using in-lab and in-flight measurements
- Be able to interact with experts of the Human Factors and Neuroscience domains to improve flight safety.

Practical information and registration

Natalia Perthuis - 05 61 33 80 47 – info.exed@isae-supaeo.fr



HF1 – Human Factors and Neuroergonomics for Aeronautics & Transportation

From the Advanced Master TAS Aero (Aeronautical Engineering)



Course content

HF400 - Understanding Human Behavior (25h):

- Introduction to Neuroscience and Biopsychology: Central Nervous System, Sensation v. Perception, Visual and Auditory Perception
- Vigilance, Fatigue & Rhythms
- Attention & Executive Control
- Learning & Memory
- Emotions, Stress & Decision Making
- Executive Functions & Mental Flexibility
- Application Focuses: Pilot/Autopilot Conflict; Airline Pilot Experience.

HF410 - Humans at work (25h):

- Cognitive and Physical Ergonomics
- Activity Analysis
- Social Psychology: Crew Resource Management and Reasoning Biases
- Application Focuses: Cockpit Design, Airbus, Dassault and ALTEN Human Factors perspective.

HF420 - Experimentation and Measures (25h):

- Initiation to Experimentation
- Ethics
- Eye-tracking
- Electrocardiography
- Electroencephalography
- Near Infra-Red Spectroscopy
- Application Focuses: Certification, Aviation/Aerospace psychology & medicine.

HF430 - Advanced Techniques (25h):

- Signal processing for physiological data
- Statistical analyses of experimental data
- Passive Brain-Computer-Interfaces as tools for Neuroergonomics
- Simulator studies
- Application Focuses: Experimental work using real light airplanes, Accidentology.

HF1 – Human Factors and Neuroergonomics for Aeronautics & Transportation

From the Advanced Master TAS Aero (Aeronautical Engineering)



Teaching methods

Teaching methods	Yes
Lectures / tutorial	X
Collaborative learning	
Flipped classroom	
Blended learning (online and face to face)	
Learning by doing	
Project-based	X
Simulation	
Case study	X

Assessment

HF400: Written test (60%) / Marked Practicals (40%)

HF410: Written exam (100 %)

HF420: Written exam (100 %)

HF430: Written exam (100 %)