Effective Human Machine Interface Design and Ergonomics Training Course



19 - 23 Oct 2026

Cape town

4600 € (Per Person)

Ref: #ERE9394_273814

Course Introduction / Overview:

This course provides a comprehensive exploration of Human Machine Interface (HMI) design and ergonomics, focusing on creating interfaces that are intuitive, efficient, and safe for industrial operators. In today's complex automated environments, a well-designed HMI is critical for enhancing operator performance, reducing human error, and improving overall system productivity. This program moves beyond basic screen building to delve into the core principles of human factors, cognitive psychology, and user-centered design. We will explore the foundational concepts championed by pioneers like Ben Shneiderman, whose work on interface design provides a framework for creating predictable and controllable systems. Participants will learn to apply these theories to practical, real-world scenarios, ensuring that the HMI serves as a powerful tool for situational awareness rather than a source of confusion. BIG BEN Training Center has structured this course to bridge the gap between technical implementation and human-centric principles, equipping attendees with the skills to design and evaluate high-performance HMIs that meet the demands of modern industry and adhere to established standards. This journey from A to Z covers everything from initial task analysis to final usability testing and deployment.

Target Audience / This training course is suitable for:

- Automation Engineers and Technicians.
- Control System Engineers.
- Process Control Specialists.
- System Integrators.
- Instrumentation and Control Professionals.
- UI/UX Designers working in industrial sectors.
- Operations Managers and Supervisors.
- Plant Engineers and Managers.
- Health, Safety, and Environment (HSE) Professionals.
- Industrial IT and OT Professionals.

Target Sectors and Industries:

- Manufacturing and Processing Plants.
- Oil and Gas Exploration and Production.
- Power Generation and Distribution.
- Water and Wastewater Treatment Facilities.
- Pharmaceutical and Chemical Manufacturing.
- Food and Beverage Production.
- Mining and Metals.
- Aerospace and Defense.
- Governmental bodies and public utility authorities.
- Transportation and Logistics.

Target Organizations Departments:

- Engineering and Design.
- Operations and Production.
- Maintenance and Reliability.
- Information Technology (IT) and Operational Technology (OT).
- Health, Safety, and Environment (HSE).
- Research and Development (R&D).
- Quality Assurance and Control.
- Project Management.
- Automation and Control Systems.

Course Offerings:

By the end of this course, the participants will have able to:

- Apply fundamental principles of ergonomics and human factors to HMI design.
- Conduct thorough user and task analysis to inform interface requirements.
- Design high-performance HMI screens that improve operator situational awareness.
- Implement effective data visualization and information hierarchy techniques.
- Develop and apply a consistent HMI style guide for large-scale projects.
- Design and manage alarm systems based on industry best practices.
- Create intuitive navigation structures for complex industrial systems.
- Evaluate HMI designs using established usability testing methods.
- Understand and apply key concepts from industry standards like ISA-101.
- Manage the HMI development lifecycle from concept to deployment.
- Reduce cognitive load on operators through strategic interface design.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, practical, and engaging, ensuring that participants not only learn the theory but can also apply it effectively in their professional roles. This course utilizes a blended learning approach that combines expert-led instruction with hands-on activities. Sessions will feature in-depth presentations on core concepts of HMI design, human factors, and ergonomics, supported by detailed case studies from various industries. These real-world examples will illustrate the consequences of both poor and effective HMI design, providing valuable context. A significant portion of the training is dedicated to collaborative workshops and group exercises where participants will work on simulated HMI design challenges, from creating user personas and conducting task analysis to sketching screen layouts and developing alarm philosophies. This active learning environment encourages peer-to-peer knowledge sharing and problem-solving. Participants will receive continuous feedback from the instructor throughout the practical sessions, allowing them to refine their skills in a supportive setting. The methodology emphasizes skill mastery and practical application over passive listening, preparing attendees to implement their new knowledge immediately upon returning to the workplace.

Course Agenda (Course Units):

Unit One: Foundations of HMI and Industrial Ergonomics

- Introduction to Human Machine Interface (HMI) systems.
- The evolution of operator interfaces in industrial automation.
- Core principles of ergonomics and human factors engineering.
- Understanding human cognitive processes: perception, memory, and decision-making.
- The impact of poor HMI design on safety, quality, and productivity.
- Analyzing human error and its relationship to interface design.
- Introduction to key industry standards and guidelines.

Unit Two: The User-Centered Design (UCD) Process for HMI

- Overview of the User-Centered Design lifecycle.
- Defining user requirements and creating operator personas.
- Conducting effective task analysis for control room operations.
- Developing a functional design specification for an HMI project.
- The role of context of use analysis in HMI design.
- Integrating operator feedback early in the design process.
- Mapping system functions to user tasks and goals.

Unit Three: Principles of Effective HMI Screen Design

- High-Performance HMI concepts for situational awareness.
- Information hierarchy and progressive disclosure techniques.
- Effective use of color, shape, and layout in industrial graphics.
- Designing intuitive navigation and screen structures.
- Data visualization principles for trends, charts, and dashboards.
- Best practices for displaying analog and digital information.
- Creating and implementing a comprehensive HMI style guide.

Unit Four: Advanced HMI Implementation and Usability Testing

- Designing and managing effective alarm systems.
- Principles of alarm rationalization and prioritization.
- Developing HMI for mobile devices and remote operations.
- Integrating HMI with SCADA, PLC, and IIoT platforms.
- Introduction to HMI prototyping and wireframing tools.
- Planning and conducting formal usability testing sessions.
- Analyzing usability feedback and iterating on designs.

Unit Five: HMI Project Management, Standards, and Future Trends

- Managing the HMI development and implementation lifecycle.
- In-depth review of the ISA-101 HMI Design Standard.
- Change management strategies for deploying new HMI systems.
- Documentation and training for operators and maintenance staff.
- The future of HMI: AI, augmented reality, and voice control.
- Ensuring cybersecurity considerations in HMI design.
- Final project workshop: Designing a complete HMI solution for a case study.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As automation and AI become more integrated into industrial processes, how might the fundamental principles of ergonomic HMI design need to evolve to manage the cognitive load on human operators who are supervising increasingly autonomous systems?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by deeply integrating the principles of cognitive psychology and human factors engineering with the technical aspects of HMI development. While many training programs focus solely on the features of a specific software platform, this course provides a vendor-neutral, principles-based education that is universally applicable across any system or industry. We emphasize the 'why' behind design choices, teaching participants how to create interfaces that align with human cognitive capabilities to enhance situational awareness and reduce error. The curriculum is heavily influenced by established academic research and modern industry standards, particularly ISA-101, ensuring the content is both current and authoritative. Another unique quality is the course's strong emphasis on practical application through realistic case studies and hands-on design workshops. Participants do not just learn about task analysis; they perform it. They do not just hear about high-performance graphics; they design them. This experiential approach, which bridges the gap between theoretical knowledge and real-world implementation, ensures that attendees leave with a robust, transferable skill set, capable of leading HMI design projects that deliver measurable improvements in safety, efficiency, and operator effectiveness.