Optimizing Industrial Plant Layouts with CAD Tools Training Course



16 - 20 Nov 2026

Cape town

4600 € (Per Person)

Ref: #CAD4133_271451

Course Introduction / Overview:

This course provides a comprehensive exploration of industrial plant layout optimization, a critical discipline for enhancing productivity, ensuring safety, and reducing operational costs. Participants will delve into the foundational principles and advanced techniques required to design and re-design efficient facility layouts. The curriculum bridges the gap between traditional theory and modern digital application, focusing on the practical use of advanced CAD tools for modeling, analysis, and visualization. We will explore the pioneering concepts of Richard Muther, a key figure in facility planning, and reference his seminal work, "Systematic Layout Planning," to build a strong theoretical base. This course offered by BIG BEN Training Center is meticulously designed to move beyond basic software commands, empowering attendees to make strategic decisions that impact material flow, space utilization, and overall workflow efficiency. By integrating systematic methodologies with powerful 3D plant modeling and simulation, participants will gain the skills to create layouts that are not only efficient today but also adaptable for future technological advancements and production demands.

Target Audience / This training course is suitable for:

- Industrial Engineers.
- Plant Managers and Supervisors.
- Manufacturing Engineers.
- Facility Planners and Managers.
- CAD Designers and Technicians.
- Operations Managers.
- Process Improvement Specialists.
- Project Engineers.
- Supply Chain and Logistics Professionals.
- Health and Safety Officers involved in facility design.

Target Sectors and Industries:

- General Manufacturing and Assembly.
- Automotive and Aerospace Industries.
- Pharmaceutical and Chemical Processing.
- Food and Beverage Production.
- Electronics and Semiconductor Manufacturing.
- Logistics, Warehousing, and Distribution Centers.
- Heavy Machinery and Equipment Production.
- Governmental sectors such as defense manufacturing and public utilities.
- Energy and Power Generation.

Target Organizations Departments:

- Engineering and Design.
- Operations and Production Management.
- Facility Management and Maintenance.
- Process Improvement and Quality Assurance.
- Health, Safety, and Environment (HSE).
- Project Management.
- Logistics and Supply Chain.
- Research and Development (R&D).
- Capital Projects and Planning.

Course Offerings:

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

- Apply the principles of Systematic Layout Planning (SLP) to new and existing facilities.
- Develop efficient process flow and material handling systems within a plant layout.
- Create detailed 2D drawings and 3D models of plant layouts using advanced CAD software.
- Analyze and optimize space utilization to minimize waste and improve productivity.
- Conduct workflow analysis to identify and eliminate operational bottlenecks.
- Integrate ergonomic principles and safety regulations into facility design.
- Utilize simulation tools to validate and compare different layout alternatives.
- Develop a strategic implementation plan for a new or revised plant layout.
- Evaluate the financial and operational impact of layout optimization projects.
- Prepare compelling proposals and presentations for layout improvement initiatives.

Course Methodology:

The training methodology at BIG BEN Training Center is centered on immersive, hands-on learning to ensure participants can immediately apply their new skills. This course moves beyond theoretical lectures by integrating extensive practical workshops where attendees will work directly with CAD software on real-world scenarios. The learning process is reinforced through a blend of interactive presentations, expert-led demonstrations, and in-depth case study analyses of successful and unsuccessful plant layouts. Participants will engage in collaborative group projects, encouraging peer-to-peer learning and the exchange of diverse industry perspectives. These activities are designed to simulate the challenges of actual facility planning projects, from initial data collection to the final layout proposal. Regular feedback sessions with the instructor will provide personalized guidance, helping each participant to master the techniques and build confidence in their decision-making abilities. The focus is on developing a strategic mindset for layout optimization, not just technical proficiency with a tool.

Course Agenda (Course Units):

Unit One: Fundamentals of Plant Layout and CAD Integration

- Introduction to industrial plant layout and its impact on business performance.
- Core principles of facility planning and design.
- Types of plant layouts (Product, Process, Fixed-Position, Cellular).
- Understanding the role of CAD in modern plant design.
- Introduction to the user interface and basic commands of relevant CAD software.
- Setting up a drawing environment for plant layout projects.
- The relationship between process flow, material handling, and layout design.

Unit Two: Systematic Layout Planning (SLP) and Data Analysis

- Deep dive into Richard Muther's Systematic Layout Planning (SLP) methodology.
- Phase I: Data gathering and analysis of Products, Quantities, Routing, and Services.
- Developing From-To charts and relationship diagrams (REL charts).
- Techniques for activity relationship analysis and space requirement calculations.
- Creating space relationship diagrams.
- Phase II: Generating and evaluating alternative layout concepts.
- Practical exercises in applying SLP to a sample case study.

Unit Three: Advanced 2D and 3D CAD Modeling for Plant Layout

- Creating detailed 2D equipment blocks and architectural floor plans.
- Techniques for layering, dimensioning, and annotating layout drawings.
- Transitioning from 2D concepts to 3D models for enhanced visualization.
- Building a 3D model of the plant shell and structural elements.
- Modeling machinery, equipment, and material handling systems in 3D.
- Creating realistic walkthroughs and fly-throughs of the proposed layout.
- Generating P&ID diagrams and integrating them with the 3D model.

Unit Four: Layout Analysis, Simulation, and Optimization

- Techniques for material flow analysis using spaghetti diagrams and flow process charts.
- Identifying and analyzing bottlenecks in a production line.
- Introduction to digital simulation for layout validation.
- Setting up a basic simulation model to test layout efficiency.
- Analyzing simulation results to compare layout alternatives based on key metrics.
- Applying lean manufacturing principles (e.g., 5S, visual management) to layout design.
- Cost-benefit analysis for layout improvement projects.

Unit Five: Implementation, Safety, and Future Trends

- Developing a phased implementation plan for a new layout.
- Managing the transition to minimize operational disruption.
- Integrating safety standards and regulations (e.g., OSHA) into the layout.
- Ergonomic considerations for workstation and facility design.
- Introduction to smart factories and Industry 4.0 concepts in plant layout.
- The role of digital twins and virtual reality (VR) in future facility planning.
- Final project presentation and course review.

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 Industry 4.0 integrates digital twins and AI, how might the traditional principles of Systematic Layout Planning evolve to accommodate predictive and adaptive factory layouts?

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

This course distinguishes itself by offering a holistic and strategic approach to plant layout optimization, rather than focusing solely on software proficiency. While many courses teach the "how" of using CAD tools, we emphasize the "why" behind every design decision. We achieve this by deeply integrating foundational, time-tested methodologies like Richard Muther's Systematic Layout Planning (SLP) with the practical application of advanced 3D modeling and simulation. This dual focus ensures participants not only create visually impressive layouts but also develop analytically sound designs that genuinely enhance operational efficiency, safety, and material flow. Furthermore, the curriculum is built around real-world case studies and hands-on projects that challenge participants to solve complex problems. The emphasis is on developing critical thinking and analytical skills, enabling attendees to justify their layout proposals with solid data and analysis. This course is designed to cultivate strategic facility planners who can create adaptable, future-proof layouts that provide a lasting competitive advantage, moving them beyond the role of a technician to that of a key strategic contributor.