Building Digital Factory using Witness Horizon Software

Course Duration: 30hrs

Process Plant Optimization plays a very important role in today's industrial world. For optimization benefits to be substantial, the cost of production including operation interruptions must be kept to a minimum. This requires effective management of maintenance operations and optimization of equipment and plant reliability and availability. This also involves effective inspection and maintenance strategies, and planning methods. Plant optimization can be an effective way to achieve improved profitability.

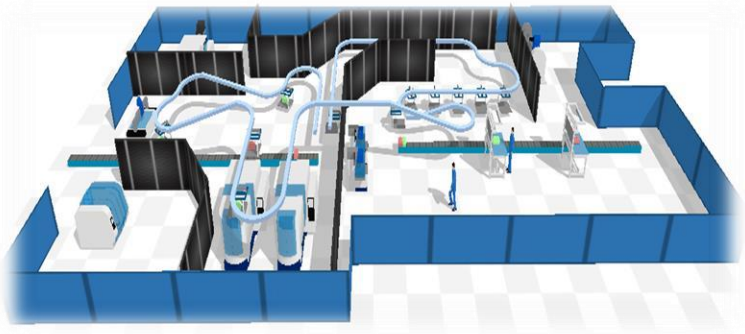
Course Objectives:

- Introduce students to the fundamental concepts of discrete event simulation (DES)
- Provide hands-on experience with WITNESS Horizon software, including model building, running simulations, and analyzing results.
- Enable students to apply DES and WITNESS Horizon to solve real-world problems in various industries.

Course Outcome:

- Design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy.
- Apply statistical and simulation tools, optimization, and meta heuristics techniques for analysis of various systems leading to better decision making.
- Demonstrate the engineering relationships between the management tasks of planning, organization, leadership, control, and the human element in various sectors of factory.

Course Outline:



- **Introduction to Discrete Event Simulation (DES)**

○ Overview of DES principles and applications ○ Key concepts such as entities, activities, resources, and queues ○ Benefits and limitations of DES

- **WITNESS Horizon Overview**

○ Introduction to WITNESS Horizon software ○

User interface and navigation

• **Building Basic WITNESS Horizon Models**

○ Creating and defining entities, activities, and buffers ○ Using

logical elements such as variables, attributes, and functions ○

Connecting elements using graphical and rule-based relationships

• **Running and Analyzing WITNESS Horizon Simulations**

○ Setting up simulation parameters and running experiments ○

Collecting and analyzing simulation results ○ Interpreting statistics

and visualizations

• **Advanced WITNESS Horizon Modeling Techniques**

○ Utilizing advanced features like conveyors, paths, and labor shifts ○ Implementing conditional logic and decision points ○ Incorporating external data sources and dynamic input • **Case Studies and Applications of WITNESS Horizon**

○ Exploring real-world examples of WITNESS Horizon applications

○ Applying DES to solve problems in various industries such as manufacturing, healthcare, and logistics. ○ Identifying potential areas for simulation improvement in existing systems

• **WITNESS Horizon for Optimization and Decision Making** ○ Using simulation to optimize resource allocation and process design ○ Evaluating alternative scenarios and making informed decisions ○ Integrating simulation into continuous improvement initiatives

- **Modeling Exercise: Designing a Manufacturing Assembly Line & Line Balancing**

  - Applying WITNESS Horizon to model a simple manufacturing assembly line.
  - Analyzing simulation results to identify bottlenecks and potential improvements. ○ Presenting findings and recommendations

- **Modeling Exercise: Simulating a Logistics Network**

  - Building a WITNESS Horizon model to simulate a logistics network.
  - Analyzing simulation results to identify potential transportation bottlenecks and delivery delays. ○ Developing strategies to optimize the logistics network and improve efficiency.