Three-day course:

SMART PRODUCTION SYSTEMS

Offered by SPS LLC

Course goals:

- Introduce the attendees to the main concepts and software of Smart Production Systems (SPS)
- Provide the knowledge and hands-on experience necessary for managing production systems in SPS environment.

Intended audience: Managerial and engineering personnel of large, mid-size, and small manufacturing organizations.

Prerequisites: None.

Course organization:

- Each of the three days consists of two sessions: morning (from 9 am to 12 noon) and afternoon (from 1 pm to 4 pm).
- Each session consists of three periods of 50 min with 10 min breaks in between.

Course resources:

- Textbook: S.M. Meerkov, P. Alavian, and L. Zhang, *Smart Production Systems*, Best Seller Publishing, 2025. This book will be provided to all course attendees.
- Website: www.SmartProductionSystems.com

Course instructors: S.M. Meerkov, P. Alavian, L. Zhang

Course Syllabus:

DAY 1:

Morning session:

- Smart Production Systems (SPS)
- Programmable Manufacturing Advisor (PMA)
- Relationship of SPS with Industry 4.0
- Foundation of PMA analytics and software: Production Systems Engineering (PSE) and PSE-Toolbox
- Preview: A Brief Demonstration of SPS Operation

Afternoon session:

- Production System Types
- Machine and Buffer Parameters
- Evaluating Machines Parameters using Factory Floor Measurements
- Performance Metrics
- Mathematical Models of Production Systems

- Hands-on exercise: Familiarize yourself with PSE Toolbox and PMA demos (available on the course website under the PRODUCTS tab) and use them for "design" of improvement projects (based on example-systems included in the demos).

DAY 2:

Morning session:

- Elements of Production Systems Engineering (PSE)
    - PSE General Characterization
    - PSE Analytics for Performance Metrics Evaluation
    - PSE Analytics for Management Concepts
        - Bottleneck machine
        - Intermittent bottleneck machine
        - Bottleneck buffer and buffering potency
        - Quality bottleneck
        - Closed lines impediment
        - Production lead time analysis and control
        - Lean buffering
        - Product-mix performance portrait of multi-job production systems

Afternoon session:

- PSE Toolbox and PSE Toolbox-assisted Design of Continuous Improvement Projects
  - PSE Toolbox Homepage
  - Illustration of PSE Toolbox Operation
  - Procedure for PSE Toolbox-assisted Design of Continuous Improvement Projects

- Hands-on exercise: Design a continuous improvement project for a system to be defined in the class using the PSE Toolbox-assisted approach.

DAY 3:

Morning session:

- PMA and PMA-enabled Design of Continuous Improvement Projects
  - PMA and PMA-based SPS Architectures
  - PMA-based SPS Modes of Operation
  - PMA-based SPS Homepage and Workflow
  - Illustration of PMA-based SPS Operation
  - Procedure for PMA-enabled Design of Continuous Improvement Projects

- Hands-on exercise: Design a continuous improvement project for a system to be defined in the class using the PMA-enabled approach.

Afternoon session

- Examples of PMA-based Operation
  - Smart Transmission Case Machining Line
  - Smart Electronic Board Production System
  - Smart Ignition Control Module Assembly System

- Course concluding remarks.

Upon successful completion of this course, the attendees will receive a Certificate of SPS Training.

Updated 2/14/2025