

The background of the slide is a close-up, slightly blurred image of industrial machinery. It features several large, metallic gears and a complex arrangement of metal plates and structural components, suggesting a manufacturing or automation environment. The lighting is dramatic, with highlights on the metallic surfaces and deep shadows in the recessed areas.

Industrial Automation Introduction

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COURSE OBJECTIVES

- ➔ **To show the importance of information and control in the context of industrial production, mainly in relationship to manufacturing**
- ➔ **To describe methods and tools to support information and control in such a context**

COURSE CONTEXT

Ideal world where imperfections, if taken into account, are statistically evaluated

MPS, BOM,
Inventory

On-line
scheduling

Process

PLANNING
(MRP, MRPII, ERP)

EXECUTION
(MES)

CONTROL
(PLC, SCADA, ...)

Statistical
data

Process
status

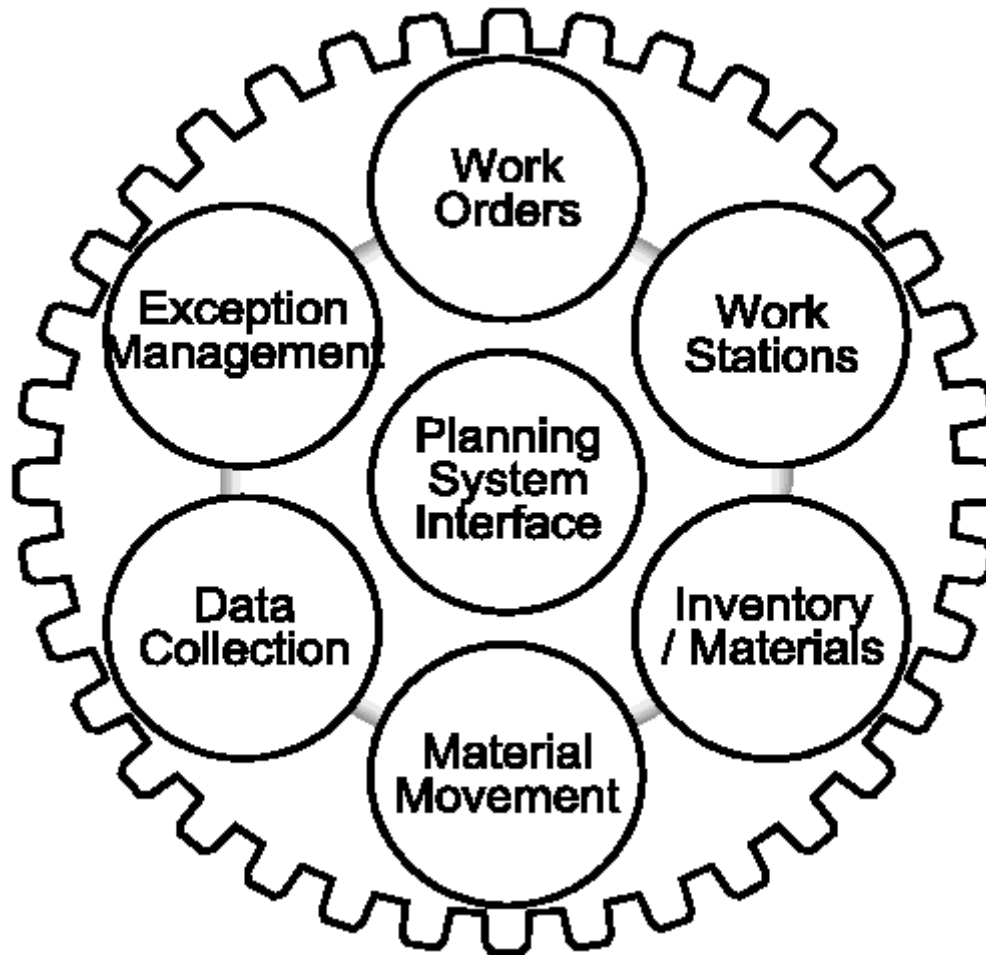
HW alarms,
Data process

*Real world where
imperfections
and unforeseen events
are present*

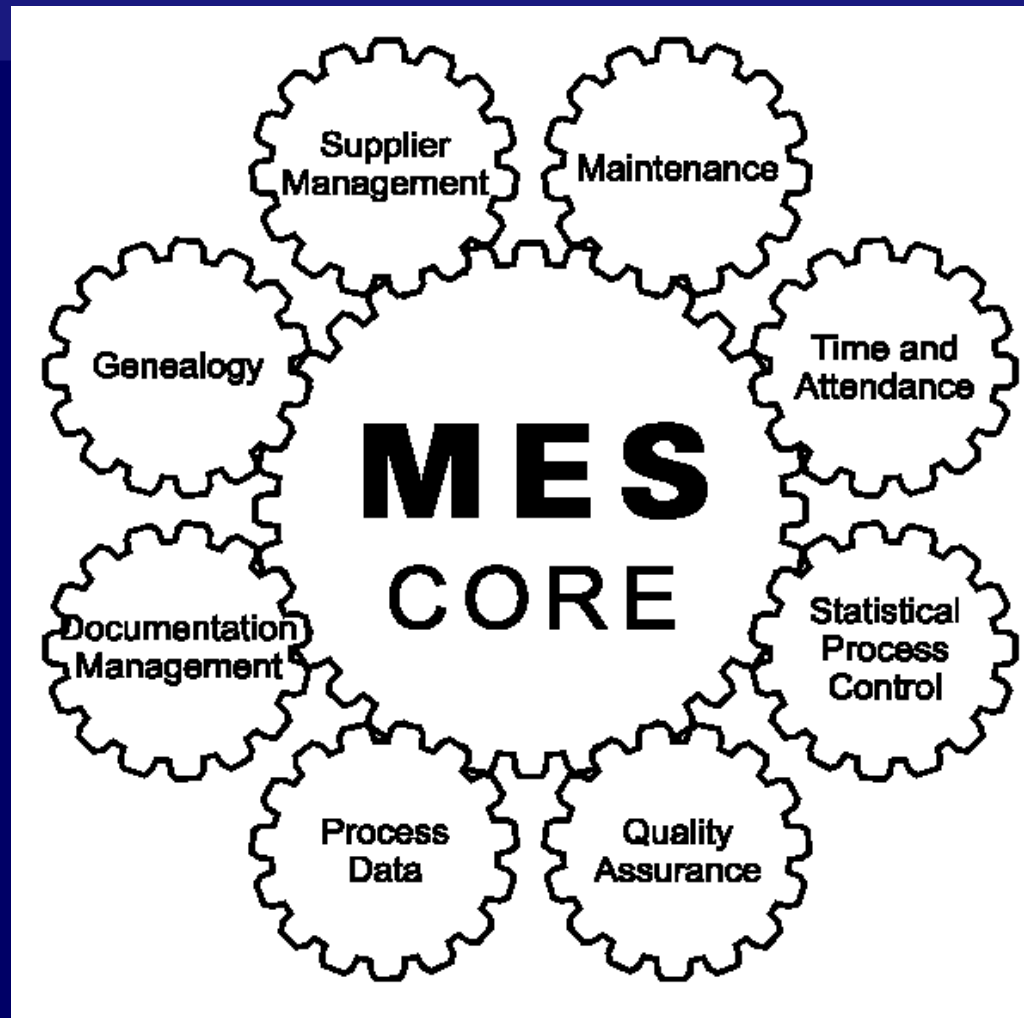
Shopfloor



MES (MANUFACTURING EXECUTION SYSTEM) PRIMARY FUNCTIONS



MES SUPPORT FUNCTIONS



COURSE PROGRAM (1/5)

- ⇒ **Introduction to production systems**
 - ⇒ **Exercises: Introduction to Matlab**
- ⇒ **Shopfloor description and examples**

COURSE PROGRAM (2/5)

- ⇒ **Field Level and Direct Control (SCADA, PLC, ...)**
- ⇒ **Generate Ladder Logic Diagrams**
- ⇒ **Exercises in Matlab:**
 - ⇒ **Control of basic discrete time systems (eg. a tank level)**
 - ⇒ **LQ, LQ tracking, PID**

COURSE PROGRAM (3/5)

➔ MES Primary functions

➔ Exercises in Matlab:

➔ Scheduling

➔ Statistical process control

➔ MES support functions

COURSE PROGRAM (4/5)

- ⇒ **MRP (Material Requirement Planning)**
- ⇒ **MRPII (Manufacturing Resources Planning)**
- ⇒ **ERP (Enterprise Resource Planning)**
- ⇒ **Exercises in mathematical programming on production planning**

COURSE PROGRAM (5/5)

⇒ Use Case

⇒ Industrial partner platforms and case studies for industrial automation