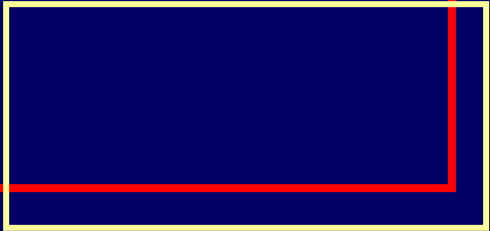
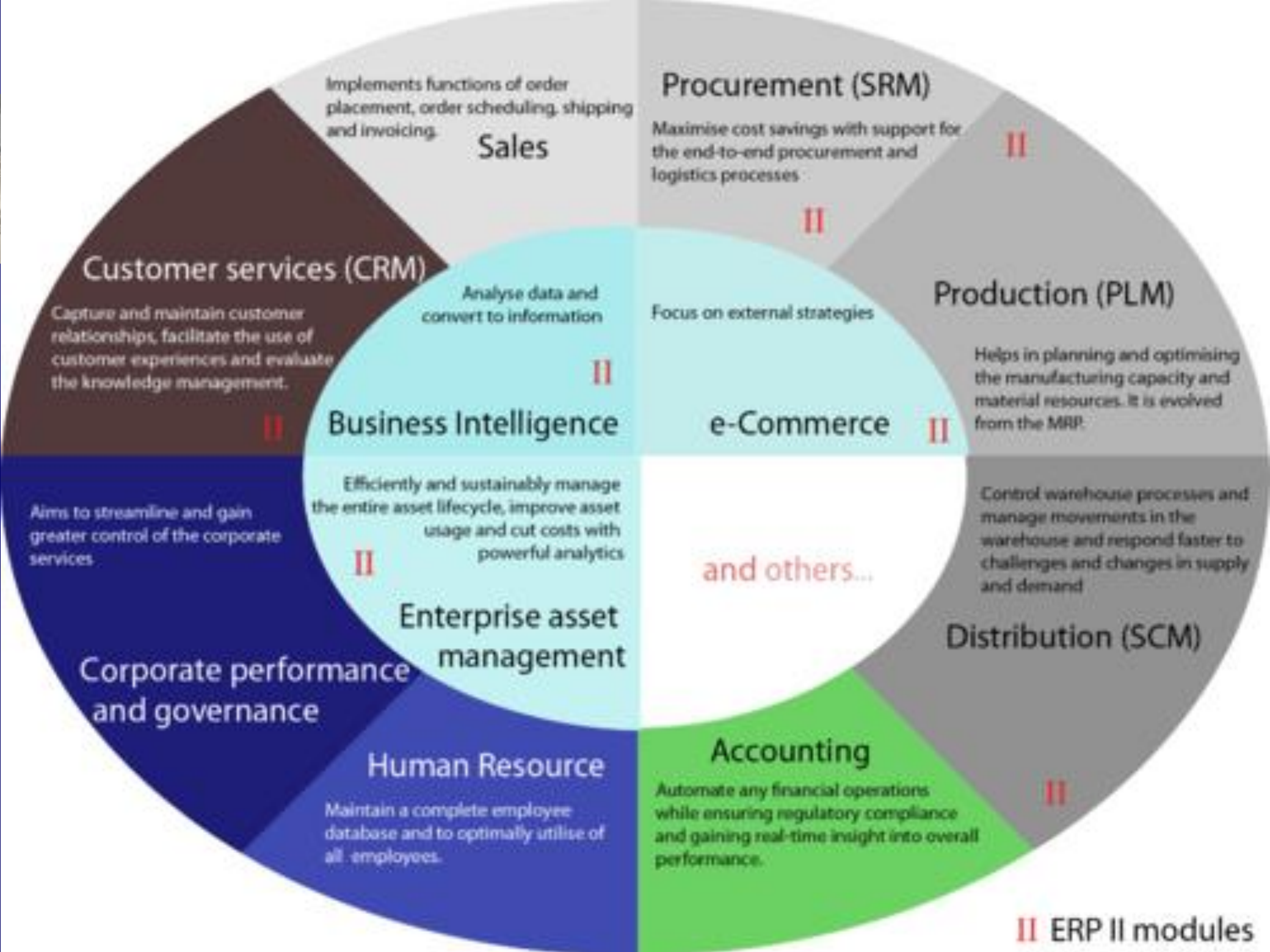




# ERP

⇒ **Enterprise resource planning (ERP) is the integrated management of core business processes mediated by software and technology.**







# MES

- ➔ **Manufacturing execution systems (MES) are computerized systems used in manufacturing, to track and document the transformation of raw materials to finished goods.**

# MES

- ➔ **MES provides information that helps manufacturing decision makers understand how current conditions on the plant floor can be optimized to improve production output.**
- ➔ **MES works in real time to enable the control of multiple elements of the production process (e.g. inputs, personnel, machines and support services).**

# MOM

- ➔ **Manufacturing operations management (MOM) is a collection of systems for managing end-to-end manufacturing processes with a view to optimizing efficiency.**
- ➔ **Production management software provides real-time information about jobs and orders, labor and materials, machine status, and product shipments.**



## **MOM vs MES (1 of 2)**

- ➔ **When the term Manufacturing Execution Systems (MES) was coined nearly 25 years ago by AMR, the MES acronym was intended to sound like “mess” because that is what it was.**
- ➔ **Over the late 1990’s and early 2000’s, much of the good work done by the automation industry in creating batch level standards, like ISA-88, was being extended to the enterprise with the ISA-95 standard.**

## **MOM vs MES (2 of 2)**

- ➔ **Later on, business processes were defined within the MOM space, including the areas of: Production, Quality, Maintenance, and Inventory.**
- ➔ **So, MES mainly focuses on the plant floor, with minimal integration beyond the four walls or across business functions. The new MOM solutions created the flexibility and scalability needed to become a true enterprise application.**





# Enterprise Information and Supply Chain Management

Level 4

Timeframe: years, months, weeks, days

Business Process transactions

Production

Quality

Inventory

Maintenance

ISA-95.05  
Functionality

## Manufacturing Operations Management

Level 3

Timeframe: days, shifts, hours, minutes, seconds

Production Management Transactions

ISA-95.03/04 Functionality

Continuous Production Control

Batch Production Control

Discrete Production Control

Sensors, Actuators and Logical Devices

Real-Time Control & Events

Levels 0, 1, 2



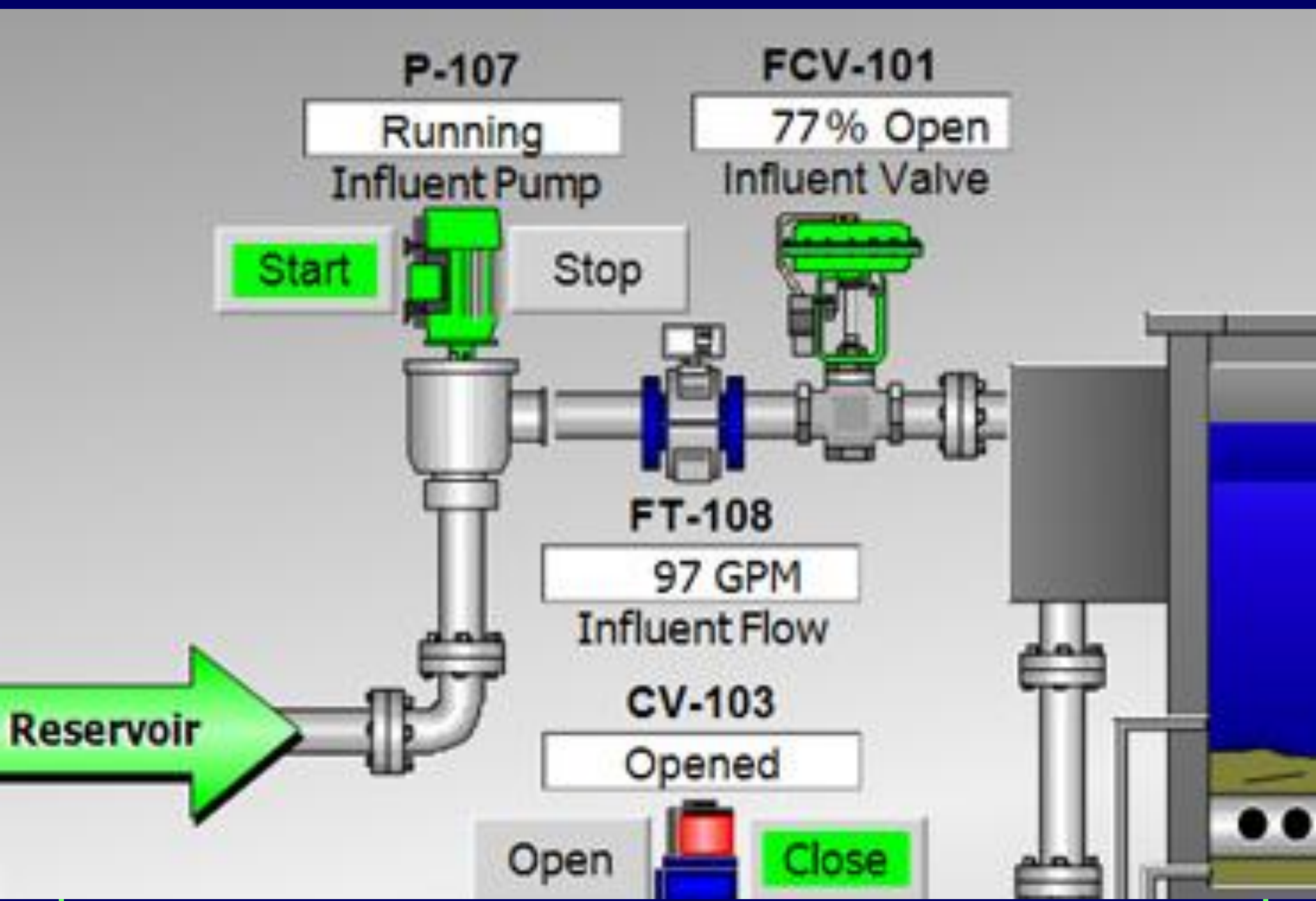
# SCADA

- ➔ **Supervisory control and data acquisition (SCADA) is a control system architecture that uses computers, networked data communications and graphical user interfaces for high-level process supervisory management, but uses other peripheral devices such as programmable logic controllers (PLC) and discrete PID controllers to interface to the process plant or machinery.**

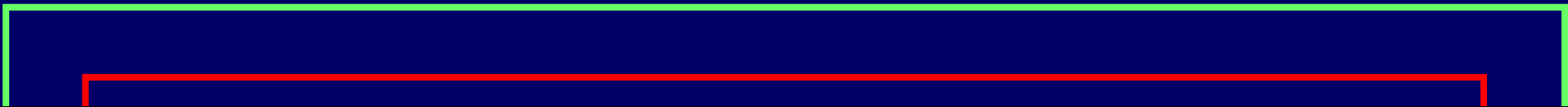
# SCADA

- ➡ The operator interfaces which enable monitoring and the issuing of process commands, such as controller set point changes, are handled through the SCADA supervisory computer system. However, the real-time control logic or controller calculations are performed by networked modules which connect to the field sensors and actuators.

- ➡ <https://www.youtube.com/watch?v=sphvkkkybTt0>

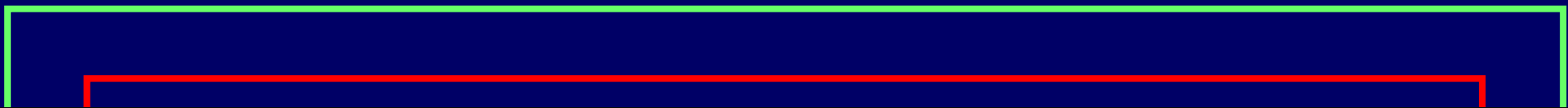






# ASRS

- ➔ **An automated storage and retrieval system (ASRS or AS/RS) consists of a variety of computer-controlled systems for automatically placing and retrieving loads from defined storage locations**
- ➔ <https://www.youtube.com/watch?v=tNY4PDbNGlc>



# PLC

- ➔ **A programmable logic controller (PLC), or programmable controller is an industrial digital computer which has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, or robotic devices, or any activity that requires high reliability control and ease of programming and process fault diagnosis.**





# PLC

- ➔ They were first developed in the automobile industry to provide flexible, ruggedised and easily programmable controllers to replace hard-wired relays, timers and sequencers. Since then they have been widely adopted as high-reliability automation controllers suitable for harsh environments. A PLC is an example of a "hard" real-time system since output results must be produced in response to input conditions within a limited time, otherwise unintended operation will result.



80167	PRODUCTION SYSTEMS (1° Semestre)	ING-INF/04	6	6 CFU CARATTERIZZANTI Ingegneria Informatica	AICARDI MICHELE	LEZ: 48
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## ERP Planning

80268	OPTIMISATION AND CONTROL OF LOGISTICS SYSTEMS (1° Semestre)	ING-INF/04	6	6 CFU CARATTERIZZANTI Ingegneria Informatica	SACONE SIMONA	LEZ: 48
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## Execution

Genealogy

Asset  
Management

86794	TRANSACTIONAL SYSTEMS & DATA WAREHOUSE (2° Semestre)	ING-INF/05	6	6 CFU CARATTERIZZANTI Ingegneria Informatica	BOCCALATTE ANTONIO	LEZ: 48
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MES

Order  
Tracking

Assurance

Scheduling

## Device Control Systems - PLC, SCADA

ASRS

Tool Storage

Test

80551	TECHNOLOGIES FOR INDUSTRIAL AUTOMATION (1° Semestre)	ING-INF/07	6	6 CFU AFFINI O INTEGRATIVE Attività Formative Affini o Integrative	PINCETI PAOLO	LEZ: 48
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Process PLC

Process  
Sensor

Work Cells

80190	EMBEDDED SYSTEMS (1° Semestre)	ING-INF/04	6	6 CFU A SCELTA A Scelta dello Studente	SIMETTI ENRICO	LEZ: 48
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