CM5 Production Engineering

LEARNING OBJECTIVES

Production engineering is the core of successful industrial companies dealing with the entire product value chain, from product design to production and after-sale services. The Production Engineering track is designed to convey the solid knowledge, judgment, and skills required to design and improve production in all its aspects in industries.

PRE-REQUISITES

The recommended prerequisites for the Production Engineering track are basic Mechanical Engineering design, manufacturing, and control knowledge.

LEARNING OUTCOMES

The Production Engineering track aims to equip students with fundamental and advanced skills at the intersection of mechanical, industrial, and automation engineering. Specific learning outcomes include:

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1. Technical Skills to ensure the fundamental capability of working hands-on with the production processes, the manufacturing resources (machines, robots/co-bots, etc.), their arrangements in production systems and layouts, and their operations, including production management, equipment maintenance, monitoring and control of product and process quality, and logistics;

2. Analytical Skills to optimally manage the use of resources in production plants and complex engineering systems using advanced approaches (i.e., AI, machine learning, statistical models, optimization algorithms, etc.);

3. Digital Skills to model data and simulate manufacturing processes, material flows, and energy flows in complex industrial plants (i.e., discrete event simulation, virtual reality, etc.) using advanced software in specific laboratory activities;

4. Problem-setting and Solving to identify, formulate, and solve production engineering problems in a large variety of industrial sectors (i.e., energy, automotive, aerospace, electronics, food and beverage, etc.);

5. Project Management and Decision Making considering economic, environmental, and social impacts;

6. Teamwork and Communication to work effectively in multidisciplinary teams, students will learn to share successfully and present production engineering solutions clearly and persuasively to a variety of audiences.

7. By completing this track, students are expected to emerge as professionals with advanced knowledge and skills to support industries in the green and digital transition that will significantly affect production engineering in the upcoming years.

LEARNING OUTCOMES

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JOB OPPORTUNITIES

Upon completing the track, students will be well-equipped for various jobs, e.g., manufacturing engineer, production engineer, planning & control manager, plant manager, data scientist/analyst, process improvement engineer, product development analyst, quality engineer, project manager, maintenance manager, and systems engineer. These jobs span various industries, including automotive, aerospace, electronics, food and beverage, healthcare, and energy.

PARTNER UNIVERSITIES

The Production Engineering track has established connections with prominent European and international academic institutions, facilitating opportunities for students to conduct thesis works in collaboration with partner companies (e.g., Siemens, Stellantis, ST Microelectronics, Magneti Marelli, etc.) and universities among which University of Technology Sydney (UTS, Australia), Polytechnique Montréal (Poly, Canada), Shanghai Jiao Tong University (SJTU, China), University of Hong Kong (HKU, China), CentraleSupélec (CS, France), Karlsruher Institut für Technologie (KIT, Germany), Technische Universität München (TUM, Germany), National University of Singapore (NUS, Singapore), Chalmers Tekniska Högskola (Chalmers, Sweden), Kungliga Tekniska Högskolan (KTH, Sweden), Linköpings universitet (LiU, Sweden), Technische Universiteit Eindhoven (TUe, The Netherlands), Universiteit Utrecht (UU, The Netherlands), Georgia Institute of Technology (Georgia Tech, USA), Massachusetts Institute of Technology (MIT, USA), and Rutgers, The State University of New Jersey (RU, USA).

For further info and courses, please refer to the Educational Rules available on the School website: **https://www.ingindinf.polimi.it/formazione/regolamenti-didattici**