Practical approach in electronics education - An integration of Electria factory with engineering education

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Abstract

Integrating a small-scale electronics production line (Metropolia Electria Factory, https://www.metropolia.fi/en/services/electria-factory-electronics-manufacturing-rd-solutions) into the third-year curriculum of an Electronics Engineering bachelor's degree program offers a effective pedagogigal approach to bridging academic studies with real-world industry requirements and practicies.

This presentation discusses the synergy between theoretical knowledge and practical application, introducing a new course Embedded System Design and Testing (15 ECTS) basing on project based learning with a focus on how students gain deep understanding on electronics product design and manufacturing.

By engaging in hands-on projects where students design, assemble, and test printed circuit boards (PCBs) in a small scale PCB production line, they encounter the requirements and challenges of automated PCB assembly firsthand. This experience emphasizes the importance of designing for manufacturability (DFM), a critical consideration in the electronics industry. The collaboration within project teams fosters also teamwork and problem-solving skills, essential for their future professional careers. Through this integrated approach, students not only deepen their understanding of electronics and PCB design but also acquire practical skills in operating production line equipment, quality control, and troubleshooting.

The goal of this project integrating of a small-scale electronics factory into the curriculum significantly enhances students' expertise in product design and prepares them to meet the challenges of the evolving electronics industry with a more holistic and applied knowledge base.

Keywords

Electronics education, design for manufacturing, PCB design, testing