Karlsruher Institut für Technologie

Institut für Produktionstechnik

BACHELOR/MASTER-THESIS

INTELLIGENT PRODUCTION ENABLING CIRCULAR ECONOMY CPPS FOR REMANUFACTURING

DESCRIPTION

Do you have a passion for sustainability and digital innovation? If so, this thesis opportunity is tailor-made for you. Cyber-Physical Production Systems (CPPS) form the backbone of Industry 4.0, driving intelligent, connected, and data-driven manufacturing. While CPPS have been well-explored in traditional production, **remanufacturing** introduces entirely new challenges: varying conditions of returned products, complex decision-making in inspection and reprocessing, and the integration of external data from the reverse supply chain require innovative, tailored solutions.

This thesis aims to develop a **concept for a reference architecture for CPPS in remanufacturing** that directly tackles these challenges. By analyzing existing concepts, identifying transferable principles, and integrating them into a layered model, the study will answer key questions: What functional requirements must a CPPS fulfill for remanufacturing? What technical components are necessary? This conceptual approach will provide a foundation for future implementations, ensuring that CPPS can be effectively adapted to meet the unique demands of remanufacturing.

TASKS

- **Literatur Review**: Examination of existing CPPS architechtures
- **Requirement Analysis**: Derivation of functional and technical requirements
- **Application to Remanufacturing:** Identification of specific challenges and adaptation of existing models
- **Concept for a Reference Architecture**: Definition of a model with functional and technical components

ADDITIONAL INFORMATION

- Start: as soon as possible
- Duration: 6 Months
- Studies: Mechincal/Industrial Engineering or similar
- Required Documents: CV and transcripts of grades

CONTACT

M.Sc. Maurice Engels
50.36, Room 107
Tel.: +49 1734 216348
E-Mail: maurice.engels@kit.edu