



National University of Sciences and Technology

Course Description

Course Title	Course Code	Credit Hours
Smart Manufacturing Systems	ME-872	3 – 0

Textbook:

- Smart Manufacturing Systems: Concepts, Design, and Optimization by Lihui Wang, Xi Vincent Wang, and Andrew Y.C. Nee

Reference Books:

- Smart Manufacturing: Applications and Case Studies edited by P. Ravi Shankar and Mohammad Jawaid
- Industrial Internet of Things: Cyber manufacturing Systems edited by Sabina Jeschke, Christian Brecher, and Houbing Song

Course Objective:

- The objective of this course is to introduce students to the concept of Smart Manufacturing Systems and provide them with a comprehensive understanding of the principles, practices, and technologies involved in the design and implementation of such systems.

Course Outline:

- Module 1: Introduction to Smart Manufacturing Systems, Overview of Smart Manufacturing Systems Historical background and evolution of Smart Manufacturing Systems, Applications and benefits of Smart Manufacturing Systems
- Module 2: Key Technologies in Smart Manufacturing Systems, industrial Internet of Things (IIoT) , Cyber-physical systems (CPS) , Cloud computing and big data analytics, Artificial intelligence and machine learning, Robotics and automation, Additive manufacturing
- Module 3: Design and Development of Smart Manufacturing Systems, System modeling and simulation, System architecture and integration, Human-machine interfaces (HMI) and operator training, Control and optimization, Safety and reliability
- Module 4: Evaluation and Optimization of Smart Manufacturing Systems, Metrics and performance indicators, Quality control and assurance, Maintenance and repair, Sustainability and environmental impact, Cost-benefit analysis and return on investment (ROI)
- Module 5: Case Studies and Future Trends, Case studies of successful Smart Manufacturing Systems Emerging trends and challenges in Smart Manufacturing Systems, Opportunities for research and innovation in Smart Manufacturing Systems

ASSESSMENTS

Description	Percentage Weightage (%)
Assignments	05-10%
Quizzes	10-15%
Mid Semester Exams	30-40%
End Semester Exam	40-50%