INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
भारतीय प्रौद्योगिकी संस्थान तिरुपति
Yerpedu-Venkatagiri Road, Yerpedu Post, Tirupati District, Andhra Pradesh - 517 619

1.	Title of the course	Special Topics in Elements of Smart Manufacturing
2.	Course number	ME541L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	New
5.	To be offered by	Mechanical Engineering
6.	Prerequisite	CoT
7.	**Course Objective(s):** To provide the foundational aspects of sensors, data ingestion systems, data science and artificial intelligence methods, as well as digital twins relevant to the emerging smart manufacturing systems.	
8.	**Course Content:** Introduction: smart manufacturing, Internet of Things (IoT) architectures of modern manufacturing systems, Data ingestion: signal conditioning, signal analysis, manufacturing measurement and data acquisition fundamentals, Edge and cloud data analysis: Fourier analysis and sampling, introduction to feature extraction and periodogram analysis, state estimation, classification methods, classical time-series methods, autoregressive moving average modeling, Advanced topics: overview of IoT sensors, advanced feature extraction via product manufacturing information modeling, intermediate signal analysis and feature extraction, sensor fusion for manufacturing applications.	
9.	**Textbook(s):** 1. Soroush M, Baldea M M, and Edgar T, Smart Manufacturing - Concepts and Methods, Elsevier Science (2020).	
10.	**Reference(s):** 1. Tao F, Zhang M, and Nee A Y C, Digital Twin Driven Smart Manufacturing, Academic Press (2019). 2. Li W, Liang Y, and Wang S, Data Driven Smart Manufacturing Technologies and Applications, Springer International Publishing (2021).	