

# Advanced Manufacturing with IIoT and Digital Twins: Unlocking Operational Intelligence for Industry 4.0"

Tapasya Gaikwad, Mukti Kadam, Chetana Purkar

Department of Mechanical Engineering  
Guru Gobind Singh Polytechnic, Nashik

**Abstract:** *Digital twins (DTs) and the Industrial Internet of Things(IIoT) are transubstantiating the relationship between digital models and palpable goods. DTs are virtual representations of their physical counterparts, and IIoT links to intelligence in the physical world. DTs will thus be relatively useful for testing and modelling new parameters and design variations. nonetheless, despite DTs' apparent eventuality, their use and acceptance are still confined, and they're still unfit to set themselves piecemeal from simulation technologies. The conception is defined, the development and elaboration of DTs are stressed, the crucial enabling technologies are reviewed, the part of IIoT as the foundation of DTs is linked, DT trends are examined, the main problems are stressed, and its operations in the manufacturing process and Assiduity 4.0 are explored. The smart materials can convert the absorbed energy or their characteristics may undergo a change. Smart materials are getting high attentions due to their commercial applications in either actuator or sensor form*

**Keywords:** Digital Twins, Internet of Things, Industrial Internet of Things, Industry 4.0, Blockchain Technology trend analysis