INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

<table>
<tr><td>Course Title</td><td>Model Based Design and Manufacturing</td><td>Course No</td><td colspan="4"></td></tr>
<tr><td>Specialization</td><td>Integrated Product Design</td><td>Structure (LTPC)</td><td>2</td><td>1</td><td>0</td><td>3</td></tr>
<tr><td>Offered for</td><td>Master of Design (Semester 4)</td><td rowspan="2">Status</td><td colspan="2" rowspan="2">Core</td><td colspan="2" rowspan="2">Elective
X</td></tr>
<tr><td>Prepared by</td><td>Dr Raguraman Munusamy</td></tr>
<tr><td>Prerequisite</td><td></td><td>To take effect from</td><td colspan="4">2021 Batch</td></tr>
<tr><td>Course Objectives</td><td colspan="6">This course will provide a broad technical knowledge and practical expertise of system requirements, design, analysis, verification and validation activities to enhance design and manufacturing capabilities. Students will gain an understanding of systems engineering, the model-based approach to design and manufacturing, the Digital Twin, and a roadmap toward a model-based enterprise.</td></tr>
<tr><td>Course Outcomes</td><td colspan="6">On successful completion of this course students will be able to:
● Explain the value and expectations of systems engineering and model-based systems engineering, and the underlying motivations and opportunities represented by a model-based enterprise. They will develop the knowledge necessary to perform a baseline assessment of an organization’s potential to leverage model-based systems engineering.</td></tr>
<tr><td>Contents of the course (With approximate break up of hours)</td><td colspan="6">Module 1: Introduction to Systems Engineering (6 hours)
● Definition and properties of a system
● Systems Engineering and the LifeCycle
● Systems Engineering Process Overview
● Business Impacts of Systems Engineering

Module 2: Model-Based Systems Engineering (8 Hours)
● Model-Based Definition
● Model-Based Systems Engineering Methodologies
● Systems Modelling Language (SysML)
● Model-Based Systems Engineering (MBSE) Application Strategies
● Verification and Validation Strategies

Module 3: Applications of Model-Based Systems Engineering (4 hours)
● Model-Based Enterprise
● Digital Thread& Digital Twin
● Business Aspects of the Model-Based Enterprise
● Realizing a Model-Based Enterprise

Module 4: Model-Based Enterprise (8 hours)
● Design Activities
● Configuration Management and Document Management
● Manufacturing Planning Activities
● Quality Requirements and Quality Planning Activities
● Enterprise Activities
● Your 4.0 Roadmap to Success

Evaluation: 70% assignments/activities + 30% End Semester</td></tr>
<tr><td>Texts & References</td><td colspan="6">1. David Long and Zane Scott (2012), A primer for model-based systems engineering, Vitech Corporation, ISBN:9781105588105
2. Jose L. Fernandez and Carlos Hernandez (2019), Practical Model Based Systems Engineering, ARTECH, ISBN:9781630815790
3. Sanford Friedenthal, Alan Moore and Rick Steiner (2015), A practical guide to SysML – The Systems Modelling Language, The MK/OMG Press, ISBN:9780128002025</td></tr>
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