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

<table>
<tr><td>Course Title</td><td>Simulation Driven Design</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 give theory and hand-on-training to conduct simulation across the product lifecycle from concept design to in-service operation across multiple disciplines encompassing structures, motion, fluids, thermal management, electromagnetics, system modelling and embedded systems, while also providing data analytics and true-to-life visualization and rendering..</td></tr>
<tr><td>Course Outcomes</td><td colspan="6">On successful completion of this course students will be able to:
• Demonstrate their software skills in the multi-disciplinary simulations including structural, fluids, thermal, manufacturing, systems modelling, IoT and multiphysics.</td></tr>
<tr><td>Contents of the course (With approximate break up of hours)</td><td colspan="6">Topics to be covered:
• Basic concept of finite element method
• Modelling techniques
• Mesh types
• Boundary constraints
• Material and Properties
• Mechanical and thermal stress analyses
• Dynamic response – impact and crashworthiness
• Product optimization in terms of product size, shape and material
• Non-linear stress analysis
• Casting and deep drawing
• Structural Optimization
• System Modelling and Control Systems
• Composite Analysis & Optimization
• Design of Experiment (DoE) Studies
• Electromagnetic simulation
Evaluation: 70% assignments/activities + 30% End Semester</td></tr>
<tr><td>Texts & References</td><td colspan="6">1. S.S. Rao (2018), The finite element method in engineering, Butterworth-Heinemann Publishers, UK, ISBN:9781856176613
2. Nam-Ho Kim (2018), Introduction to Non-linear finite element analysis, Springer, ISBN:9781441917454
3. NAFEMS (1992), A finite element primer, Bookcraft Ltd.
4. Paul Jacob and Lee Goulding (2002), An explicit finite element primer, NAFEMS Ltd., ISBN:9781874376453
5. A.A. Becker (2001), Understanding Non-linear finite element analysis, NAFEMS Ltd., ISBN:9781874376354</td></tr>
</table>