

Innovative Digital Tools enabled Product Design

Overview

Product design, today, takes the advantage of digital tools, which provide several benefits, including reducing the concept-to-product turnaround time, accelerating of the design process, making it more collaborative, reducing design errors and optimizing the final product. Information and communication technologies (ICT) provide the possibility to simulate design solutions in fully virtual environments, which are today also available at low cost due to mass production of Virtual Reality (VR) technologies. Simulations allow designers to evaluate solutions and variants, to customise each identified solution easily and swiftly, with the aim of optimizing the design. Simulations in VR would also allow the stakeholders participating to design (designers, engineers and clients) to co-design and co-review the designs, also in distributed environments.

Digital tools are commonly available and are affordable for companies; but most of the time, specific expertise is required to use them for their best performance in the design process. The course will provide an overview of state of the art digital tools, and will show case studies where digital tools have been used to design products. The participants will be exposed to methods and innovative digital tools supporting the design, engineering and validation phases of industrial products. The lecturers will present the most innovative digital tools based on virtual/augmented reality technologies, and how these tools can be used effectively in the various phases of product design. At the end, some practical case studies will be shown and discussed with the participants.

The course will address topics such as product design process, enabling digital tools, digital tools for virtual reality technology as well as augmented reality technology, products digital fabrication, case studies of digital fabrication, from physical objects to digital models, virtual humans, show cases, DFX concepts. At the end of the lectures, a summary and application of knowledge to Indian context is proposed.

The course will consist of 12 lectures of about one-hour duration and four hours of case studies discussion sessions with delegates, students participating in exercises. There will be a one-hour examination for evaluating delegate/student performance.

Dates for the Course	05 February, 2018 to 09 February, 2018
Host Institute	IIT Madras
No. of Credits	1
Maximum No. of Participants	30
You Should Attend if you are	<ul style="list-style-type: none">• Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories (IGCAR, DRDO, CSIR).• Student students at all levels (B. E. / B. Tech / M. Sc (Engg) / M. Tech / Ph. D) and Faculty from other academic institutions and technical institutions.
Course Registration Fees	<p>The participation fees for taking the course is as follows: Student Participants: Rs. 2000 Faculty Participants: Rs 5000 Government Research Organization Participants: Rs. 8000 Industry Participants: Rs.15000</p> <p>The above fee is towards participation in the course, the course material, computer use for tutorials and assignments, and laboratory equipment usage charges. Mode of payment: Demand draft in favor of "Registrar, IIT Madras" payable at Chennai. The demand draft is to be sent to the Course Coordinator at the address given below.</p>
Accommodation	<p>The participants may be provided with hostel accommodation, depending on availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel/</p>

Course Faculty



Dr. Monica Bordegoni is a Full professor of Virtual Prototyping, coordinator of the Methods and Tools for Product Design group and of the Virtual Prototyping Lab at the Department of Mechanical Engineering, Politecnico di Milano (PoliMi). Her research areas of interest include Methods for Product Design, Methods and tools for virtual

prototyping of products, interaction techniques and multimodal technologies, product experience, multisensory interaction, haptic technologies and interaction, and on their application in the engineering and industrial design sectors, olfactory display, emotional engineering. She was deputy coordinator of the European project FP6-IST Touch and Design (www.kaemart.it/touch-and-design), the coordinator of the European project FP6-IST SATIN - Sound and Tangible Interfaces for Novel product design (www.satin-project.eu), and the coordinator of the national project MIUR-FIRB PROGIMM (www.kaemart.it/progimm). She is also the Chair of the Executive Committee of ASME-CIE Division (2016-2017), member of Advisory Board of the Design Society (2015-2017), and co-chair of the Design Society interest group on Emotional Engineering. She is member of the scientific board of the I.DRIVE Lab (studies of interaction between driver, road, infrastructure, vehicle and environment, where she is responsible of the driving simulator). Monica has 10 years of Industrial experience before she started her academic career. She is member of the advisory committees of several international conferences.



Dr. Raghu Prakash is a Professor at the Department of Mechanical Engineering, Indian Institute of Technology Madras; he specializes in the areas of fatigue, fracture of materials (metals, composites, hybrids), structural integrity assessment, remaining life prediction of critical components used in Transportation, Energy sectors, apart from new

product design. He has more than twenty five years of professional experience in the field of fatigue and fracture and has to his credit more than 100 Journal, Book Chapter publications and 100 Conference publications and has edited 3 book volumes. He began his career as Scientist at National Aerospace Laboratories, Bangalore and has developed test systems for use in academia, R&D and industry during his tenure as Technical Director at BiSS Research, Bangalore; he teaches courses relating to Fracture Mechanics, Design with Advanced Materials, Product Design, DFMA at IIT Madras. He is a voting rights member of ASTM International (Technical Committees, D-30, E-08 and E-28) and has won several prestigious awards (Binani Gold Medal, Indian Institute of Metals), scholarships and Erasmus-Mundus Fellowships. He is the recipient of Distinguished Fellow of ICCES 2015 and Editor-in-Chief of Journal of Structural Longevity. He is a member of several technical societies (Indian Structural Integrity Society, Society for Failure Analysis, Indian Institute of Metals to name a few) and Vice-chair of ASME Materials Processing Technical Committee (2017-18).

Course Coordinator

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