RAPID MANUFACTURING

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PRE-REQUISITES : The student should have completed two semesters of UG Engineering or Science program

INTENDED AUDIENCE : Students of all Engineering and Science disciplines

INDUSTRIES APPLICABLE TO : HAL, NAL, SAIL, ISRO

COURSE OUTLINE :

In the contemporary dynamic manufacturing era, to produce products that can be easily made and can offer typical competences is of utmost importance. Besides basic manufacturing processes, engineering students and manufacturers needs to bolster their skills in advanced technologies. This course is a step in this direction to make the students to learn design, development, and manufacturing using Rapid Manufacturing technologies. Along with specific Rapid Prototyping techniques, manufacturing concerns such as geometric modelling, design for manufacturing and assembly, developing modular designs, group technology, et cetera are included. Laboratory demonstrations are also induced for practical experience. In the end of this course, students should be able to identify the methods and techniques required to manufacture any model.

ABOUT INSTRUCTOR :

Prof. Janakarajan Ramkumar is Professor of Mechanical Engineering Department, and Design Program, at Indian Institute of Technology, Kanpur. He teaches manufacturing science, micro/nano technology, new product development. He has a bachelors in Production Engineering with his doctorate in Defect quantification in drilling of composites from IIT Madras, India with a best thesis award. Over the years his contribution in teaching and research is remarkable. He has worked for BOSCH group and improved the productivity of the company. His research and teaching focus is on nano technology and inclusive design. He has several international and national patents in his credit and has published more than 100 journal papers.

Prof. Amandeep Singh Oberoi is a Faculty for online courses and shoulders the position of Senior Research Establishment Officer at the prestigious Indian Institute of Technology (IIT) Kanpur, India. Under the role, he is entrusted with the responsibility to manage Imagineering Laboratory, where the emphasis is principally given to providing novel product development and fostering services in defense, Agritech, and Medtech. Dr. Oberoi has accumulated an experience of over two decades: industrial and academic combined; his research interests include the things he values such as Sustainable Manufacturing Processes and Systems, along with areas such as Additive Manufacturing; Simulation of Manufacturing Systems; Product Design and Manufacturing. He has fetched grants and has holds projects from various national and international funding agencies such as DST, MoT, BIRAC, DRDO, SIDBI, CoL. His MOOCs courses in NPTEL and agMOOC are well-received, gaining favour with the audience and receiving positive feedback. Furthermore, he has visited countries like the USA, Canada, Australia, and Egypt to speak at various international symposiums organised by renowned bodies such as AARDO, CIRP, IEOM.

COURSE PLAN :

Week 1 : Introduction to Rapid Manufacturing (RM)

Week 2 : Product Design Process

Week 3 : Design for Modularity

Week 4 : Reverse Engineering

Week 5 : 3D measurement: laboratory demonstration

Week 6 : Polymerization, and Powder based RM processes

Week 7 : Liquid based, and Sheet stacking RM processes

Week 8 : 3D printing RM processes and laboratory demonstration

Week 9 : Beam Deposition RM processes, and materials in RM

Week 10 : Post-processing and costing in RM

Week 11 : Rapid Product Development (CAD/CAE/CIM)

Week 12 : Rapid Product Development (Software demonstration), and case studies on RM