



SRES's
SHREE RAMCHANDRA COLLEGE OF ENGINEERING
Lonikand, Pune – 412216 Department
of Mechanical Engineering

A Report on

Online Faculty Development Programme (FDP)

Title: ATAL FDP on “Feature Based Product Design, Digital Manufacturing”

Date: 20-24 September 2021

About the Programme:

ATAL FDP on “Feature Based Product Design, Digital Manufacturing” was held on 20-24 September 2021 in online mode. Feature-based product design and digital manufacturing is one of the most important domains which can reduce overall cost in its life cycle.

Feature-based methodology can provide for an adequate basis for the integration of design and the subsequent applications such as engineering analysis, process planning, machining and inspection.

Over the last few years, significant amount of research and development is in progress to implement feature-based technique for product design and development.

In the concluded ATAL-FDP, a wholistic approach for the product development such as concept design, analysis & simulation and the digital manufacturing processes that can be used to produce different features of the product has been offered to the participants.

Objectives of FDP:

- Understand the fundamentals of the feature-based product design, and fabrication. Generic taxonomy of product features used in the product development.
- Explain the role of modeling, analysis, and simulation in feature-based product development.
- Digital manufacturing methodology for the fabrication purpose.
- Hand-on practice on modeling, analysis, and simulation tools for the feature-based product development.
- Explain the industrial practices using use cases on feature based product development from automotive industries and component manufacturers.
- Develop and promote research interests in various aspects of the feature-based product development.



FDP Schedule:

 AICTE FDP on Feature-Based Product Design, Digital Manufacturing (Thrust Area: 3D Printing & Design) 20 – 24 September 2021			
Date; Day	Session	Expert name	Title
Day1: 20 September 2021; Monday	Inaug 09:10AM to 10:10AM		Inauguration;
	1 10:30AM to 12:30PM	Dr. Ravi Kumar Gupta	Feature-based Product Development
	2 01:30AM to 3:30PM	Dr. V. Shankar; Dr. S. GUNTI	Automotive Lightweighting
	3 03:30PM to 05:30PM	Mr. Pradeep B.	3D Images to Models: Image Processing, Model Generation, 3D Printing Preparation & Analysis
Day2: 21 September 2021; Tuesday	4 09:30AM to 11:30AM	Prof. P. V. Madhusudhan Rao	Design for Product Life-Cycle
	5 11:30AM to 01:30PM	Prof. P. V. Madhusudhan Rao	Product Design in the context Industry 4.0
	6 02:30PM to 04:30PM	Dr Guruprasad Rao	Digital Product Design in Practice
	04:30PM to 05:30PM	Session on FIT India	
Day3: 22 September 2021; Wednesday	7 09:30AM to 11:30AM	Prof. B. Gurumoorthy	Digital Manufacturing: Digitalized Product Models
	8 11:30AM to 01:30PM	Dr Guruprasad Rao	Mass Customization - Myths and the reality
	9 02:30PM to 04:30PM	Prof. B. Gurumoorthy	Digital Manufacturing: Physical Meets Digital
Day4: 23 September 2021; Thursday	10 09:30AM to 11:30AM	Dr. Dinesh Kumar	Mathematical Modelling of Basic Engineering Problems and their solutions through Simulations
	11 11:30AM to 01:30PM	Prof. J. Ramkumar	Feature Recognition for 3D Printing
	12 02:30PM to 04:30PM	Dr. Gokula V. A. Vasantha	Advances in Feature-based CAD in Product
	04:30PM to 05:30PM	Session on FIT India	
Day5: 24 September 2021; Friday	13 09:30AM to 11:30AM	Dr. Srinivas Kota	Design for Environment (DFE)
	14 11:30AM to 01:30PM	Prof. A.M.Kuthe	Class III Medical Device as Innovative Product: Start-up Perspective
	02:30PM to 04:00PM		Test, Feedback & Valedictory

Session 1 – Inauguration and Feature based product development

Prof. Alok Kumar Chakrawal, Vice-Chancellor, Guru Ghasidas Vishwavidyalaya, Bilaspur inaugurated the FDP. Being an academic leader, Prof. Alok Kumar Chakrawal has been requested to share his expertise and views on the need for comprehensive, continuous, rigorous faculty training in a dynamic, disruptive technological teaching-learning ecosystem, evolving trends, and translating academic research into impactful applications.

Laer after inauguration, Dr. Ravi Kumar Gupta introduced participants about feature based product development in this session. In feature-based design, the design process is focused on adding features to the product—on the assumption that features are what users want and that more features are better.

Session 2 – Automotive lightweighting

In the next session, Dr. V. Shankar explained Automotive lightweighting. In this session participants were learned about lightweighting in automotive industry. Lightweighting is a concept in the auto industry about building cars and trucks that are less heavy as a way to achieve better fuel efficiency and handling. Carmakers make parts from carbon fiber, windshields from plastic, and bumpers out of aluminum foam, as ways to lessen vehicle load.



Session 3 - 3D Images to Models: Image Processing, Model Generation, 3D Printing Preparation & Analysis.

The process of creating 3D models from digital data can be categorized into four major steps: image acquisition, image segmentation, creation of a 3D model, and transfer of model data to a 3D printer.

In this session, Mr. Pradeep B. demonstrated Image Processing, CAD Modeling for 3D Printing. Participants learnt the actual practical knowledge of 3D printing modeling.

Session 4 – Design for product Lifecycle

Prof. P.V. Madhusudhan Rao, has illuminated on “Design for product Lifecycle”. In this session participants were gained with the detail knowledge of Product lifecycle and its four stages namely Introduction, Growth, Maturity and Saturation.

Session 5 - Product design in the context of industry 4.0

In this session, Prof. P.V. Madhusudhan Rao discussed in brief on few of the important topics such as Industry 4.0, IIoT, and digitization. He has also explained Real-World Examples of Digital Manufacturing.

Session 6 – Digital product design in Practice

Dr Guruprasad Rao focused on Digital product design which is a technique designers use to develop digital solutions based on customer needs. Experts employ digital product design best practices to provide intelligent technological designs that meet the needs of end-users in terms of their preferences and expected performance.

Session 7 – Digital manufacturing: Digitalized Product Models

Dr. B. Gurumoorthy, Professor at the Indian Institute of Science in the Centre for Product Design and Manufacturing (CPDM) and the Department of Mechanical Engineering presented a talk on Digital manufacturing: Digitalized Product Models. Digital manufacturing is broadly understood as applying computer systems to product development, manufacturing processes, and supply chains supporting products and processes. He explained this in detail using Digitalized product models. Data-driven models that are increasingly emerging as a tool to address the lack of formal models are introduced, and problems in their use to digitalize manufacturing discussed.

Session 8 - Mass customization - Myth and the Reality

Mass customization refers to a business strategy to manufacture, market, and deliver products and services customized per the needs of individual customers. Dr Guruprasad Rao explained in depth about the four primary types of mass customization are collaborative customization, adaptive customization, transparent customization, and cosmetic customization, along with some real life examples.



Session 9 - Digital manufacturing: Physical meets Digital

Continuing with session 7, Dr. B. Gurumoorthy discussed digitalization of manufacturing in the context of product development and delivery, smart manufacturing, and infrastructure to support manufacturing and the product post-delivery.

Session 10 – Mathematical modeling of Basic engineering Problems and their solutions through Simulations

In this session, Dr. Dinesh Kumar discussed on the topic of mathematical modeling and its role in engineering problem solving through few simulations.

Session 11 – Feature recognition for 3d printing

Prof. Janakrajan Ramkumar, Department of Mechanical Engineering & Design Program, Indian Institute of Technology, Kanpur has given a talk on Feature Based Extraction, (AAG) Adjacency-Aware Greedy Algorithm, Feature Based Modeling, Additive Manufacturing Biomedical Applications.

Session 12 – Advances in feature based CAD in product

Gokula Vijaykumar Annamalai Vasantha delivered a presentation on Common design structures and substitutable feature discovery in CAD databases.

Session 13 – Design for Environment (DFE)

Design for Environment (DfE) is an approach to design where all the environmental impacts of a product are considered over the entire life cycle of a product. Early stages of product development are the key for this because if we know the environmental impacts of potential designs while designing, we can make changes to these designs then and there so as to reduce their environmental impacts.

In this session, Dr. Srinivas Kota reviewed the state of the art, identified the requirements for a tool for DFE, and explored potential means for fulfilling these requirements.

Session 14 - Class III Medical Device as Innovative Product: Start-up Perspective

Prof. A.M. Kuthe has illuminated on - Class III devices, which usually sustain or support life, are implanted, or present potential unreasonable risk of illness or injury. Examples of Class III devices include implantable pacemakers and breast implants. 10% of medical devices fall under this category in terms of start-up prospective.

Five day online ATAL FDP program on "Feature-based Product Design, Digital Manufacturing" concluded by Test, Feedback, Group Photo Session and Valedictory Function.



An e-certificate issued after successfully completing the programme is attached herewith.

No: ATAL/2021/1627880678



ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

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AICTE Training and Learning (ATAL) Academy

Certificate

This is certified that Padekar Akshay Ujjwal, Assistant Professor of Shree Ramchandra College of Engineering, Lonikand, Pune participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Feature Based Product Design, Digital Manufacturing" from 20/09/2021 to 24/09/2021 at Manipal University Jaipur.

Advisor-I, ATAL Academy
Mamta Rani Agarwal



Coordinator

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Go to

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