AICTE Training and Learning (ATAL) Academy

Faculty Development Programme on

Digital Transformation in Manufacturing: From Concept to Implementation

November 20-25, 2023

Organized by

Department of Mechanical Engineering

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

Tiruchengode - 637 215. Namakkal Dt. Tamil Nadu, INDIA

Conference Hall
Innovation Technology Park

www.ksrct.ac.in

About the Institution

The foundation of the **K.S.Rangasamy College of Technology (KSRCT)** was laid in the year 1994. KSRCT is located in a scenic campus area of over 300 acres with a built up area of 12 lakh square feet. A combination of cutting edge infrastructure and well accomplished staff make it a premier center for learning. KSRCT offers 14 undergraduate and 13 postgraduate courses in addition to 13 Ph.D. programmes in Science, Engineering & Technology and Management disciplines. The college is accredited by NAAC with A++ Grade and six UG programmes are accredited by NBA under Tier-1 category. Institute is recognized by UGC under 2(f) & 12(B) and received financial support under DST- FIST and DBT STAR college scheme. With state-of-the-art facilities at AICTE IDEA Lab, ATAL Community Innovation Centre, and MSME Business Incubator, the institute offers a strong innovation and startup ecosystem. As a result, KSRCT is positioned at the rank band of 51-100 in NIRF Innovation Rankings 2023 and retains highest star rating in Ministry of Educations Institutions Innovation Council.

Band: 51-100 (2023 Ranking)

About the Department

The Department of Mechanical Engineering was started in the year 1994. The department offers B.E. Programme in Mechanical Engineering and is recognized as research center to offer Ph.D. programme. It has good infrastructural amenities which include state of the art laboratories; approved research supervisors and dedicated faculty members covering diverse specialization: design, thermal, manufacturing and industrial engineering. The department is vibrant with several activities round the year. To meet the required academic standards, the quality instruction to students is imparted by the qualified faculty members providing good academic insights. The research expertise of the department shelters alternative fuels, smart materials, digital manufacturing, composite materials, welding and heat transfer.

About the ATAL FDP

The objective of AICTE's Training and Learning (ATAL) is to impart quality training through Faculty Development Programs (FDPs) for Postgraduate students, Research scholars and Faculty members so that: (1) Faculty have a sound domain knowledge and associated skills of the subject. (2) Its application with the prevailing practice scenario in real life with industry connect. (3) Pedagogy-requisite teaching skills needed to scientifically plan for instructional delivery, communicate the knowledge and skills to the students in an efficient manner and assess teaching-learning effectiveness. (4) Skills for need analysis, meaningful literature review, problem framework and creative problem solving. (5) Life skills so that they are motivated and fascinated to acquire knowledge and associated skills. (6) Institutional Leadership skills for senior faculty to be ready for academic leadership. (7) Understanding their roles in community wellbeing, national building and also their own career development.

Objectives of the FDP

- To recognize the challenges faced with integration of the legacy digital manufacturing systems with new advanced technologies by using the available data, and extending the new capabilities to the older equipment.
- To acquire ideas on the stages involved in conversion of the paper design to a product in reality and the modes of data transfer between machines
- To provide basic perceptive about the usage of machine tools that are self-aware; they perceive their own states and the state of the surrounding environment; and are able to make decisions related to machine activity processes.
- To produce qualified and skilled "digital workers" who possess skills in computer-based design/simulation, programming, 3D printing, and manufacturing automation to develop and maintain advanced digital-based manufacturing systems.

FDP Topics

- Introduction to Digital Manufacturing Technology
- Industry 4.0 Implementation and Practices
- Digital Transformation: Design and Manufacturing
- AI-driven Digital Manufacturing Techniques
- Research Methodology / Life skills
- Additive Manufacturing Techniques
- Digital Twin Technology
- PLM in Digital Manufacturing Ecosystem
- Robotics and Automation in the Digital Factory
- IoT Integration and Smart Manufacturing

Industrial Visit: SPB Ltd., Erode

Resource Persons

Dr.Mamilla Ravi Sankar, IIT Tirupathi

Dr.Arunachalam N, IIT Madras

Dr.Ramesh Shankar, Autodesk

Mr.Shanthababu Pandian, Cognizant, UK

Dr.G.L.Samuel, IIT Madras

Dr.M.Duraiselvam, NIT Trichy

Mr.Suresh Perinjery, PTC

Mr.Kasiviswanathan V, Alstom

Mr.M.Kumar, alfaTKG India

Dr.Sreekumar M, IIITDM

Outcome of the FDP

- In light of the Government's 'digitization' initiative, this training will help the faculty understand how products are being designed and manufactured in the digital era.
- This training shall expose all the faculty to realize what digital manufacturing is and its role on careers, practices and processes in companies of both large and small.
- Expert lectures will help to understand the workflow of digital manufacturing: from scanning to modelling to fabrication.
- This Programme will act as a platform to develop skills on exploring how data is being used to connect and transforms in each stage of the manufacturing process.
- Fruitful discussion on intelligent manufacturing tend to enhance the ability to manage production requirements rapidly based on changing market demands.
- With this FDP knowledge, faculty can produce competent and skilled "digital personnel" who can race with the digital advancements in the market.

Target Audience

Faculty members of the AICTE approved institutions, Research scholars, PG Scholars, participants from Government, Industry Bureaucrats/Technicians/ Professionals/School Teachers are eligible to attend the program.

Registration Process

FDP Mode: Offline (Physical)

Interested participants should register online at **https://atalacademy.aicte-india.org/login** and submit the nomination by the head of the institutions/ company through mail to the coordinator of this FDP.

Seats are limited (only 50) and the participants are selected by organizers on a first come first serve basis. Short-listed candidates will be informed through their email.

Certificate

Continuous Comprehensive Assessment of Candidates shall be carried out and certificate would be issued up on achieving at least 70% to receive over all in following aspects in the weightage mentioned below,

Parameter	Evaluation	Weightage
Attendance (Min. 80%)	Individual	20%
Assessment	Individual	10%
Article Summary	Team	30%
Teaching Practice	Individual	15%
Industrial Visit Report	Team	10%
Reflective Journal	Individual	15%

Important Dates

Last date for Registration : 31.10.2023

Intimation of Selection : 02.11.2023

Confirmation by Participants: 06.11.2023

Coordinator

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Detailed FDP Schedule

Date	Time	Session
20.11.2023 **(Day 1)**	09:00 AM - 09:30 AM	Inauguration
	09:30 AM - 12:00 Noon	**Introduction to Digital Manufacturing Technology**
		Resource Person: **Dr. Mamilla Ravi Sankar,** Associate Professor, Department of Mechanical Engineering, Indian Institute of Technology Tirupati
	12:00 Noon - 01:00 PM	**Article Discussion**
		Team 1-2: Industry 4.0 Team 3-4: Additive Manufacturing Team 5-6: Smart Manufacturing Team 7-8: Digital Twin Team 9-10: Robotics and Automation
	01:00 AM - 02:00 PM	Lunch
	02:00 PM - 04:30 PM	**Industry 4.0 Implementation and Practices**
		Resource Person: **Dr. N. Arunachalam,** Associate Professor, Department of Mechanical Engineering, Indian Institute of Technology Madras, Chennai
	04:30 PM - 05:30 PM	**CNC Machining (Practical Session)**
		CNC Turner, CNC Vertical Machining Centre CNC Plasma Cutter, CNC Wood Router
21.11.2023 **(Day 2)**	09:30 AM - 12:00 Noon	**Digital Transformation: Design and Manufacturing**
		Resource Person: **Dr.Ramesh Shankar,** Senior Program Manager, Autodesk, Bengaluru

FDP Schedule

Date	Time	Session
21.11.2023 **(Day 2)**	12:00 Noon - 01:00 PM	**Article Discussion** Team 1-2: Industry 4.0 Team 3-4: Additive Manufacturing Team 5-6: Smart Manufacturing Team 7-8: Digital Twin Team 9-10: Robotics and Automation
	01:00 AM - 02:00 PM	Lunch
	02:00 PM - 04:30 PM	**AI-driven Digital Manufacturing Techniques** Resource Person: **Mr.Shanthababu Pandian,** AIA Architect and Delivery Cognizant, United Kingdom
	04:30 PM - 05:30 PM	**Autodesk Fusion 360 (Practical Session)** 3D Modeling, Assembly, Simulation and Manufacturing
22.11.2023 **(Day 3)**	09:30 AM - 12:00 Noon	**Research Methodology** Resource Person: **Dr.G.L.Samuel,** Professor, Department of Mechanical Engineering, Indian Institute of Technology Madras, Chennai
	12:00 Noon - 01:00 PM	**Article Discussion** Team 1-2: Industry 4.0 Team 3-4: Additive Manufacturing Team 5-6: Smart Manufacturing Team 7-8: Digital Twin Team 9-10: Robotics and Automation
	01:00 AM - 02:00 PM	Lunch
	02:00 PM - 04:30 PM	**Additive Manufacturing Techniques** Resource Person: **Dr.M.Duraiselvam,** Professor, Department of Production Engineering, National Institute of Technology, Tiruchirappalli
	04:30 PM - 05:30 PM	**Additive Manufacturing (Practical Session)** 3D Printing - Fused Deposition Modeling, Digital Light Processing Technology

FDP Schedule

Date	Time	Session
23.11.2023 **(Day 4)**	09:30 AM - 12:00 Noon	**Digital Twin Technology**
		Resource Person: **Mr.Suresh Perinjery,** Principal Solutions Consulting, PTC, Bengaluru
	12:00 Noon - 01:00 PM	**Article Discussion**
		Team 1-2: Industry 4.0 Team 3-4: Additive Manufacturing Team 5-6: Smart Manufacturing Team 7-8: Digital Twin Team 9-10: Robotics and Automation
	01:00 AM - 02:00 PM	Lunch
	02:00 PM - 04:30 PM	**PLM in Digital Manufacturing Ecosystem**
		Resource Person: **Mr.Kasiviswanathan V,** Mechanical Lead Engineer, Alstom Transport India Ltd., Bengaluru
	04:30 PM - 05:30 PM	**Reverse Engineering (Practical Session)**
		3D Scanning, Virtual Reality
24.11.2023 **(Day 5)**	09:30 AM - 12:00 Noon	**Industrial Visit**
		Seshasayee Paper and Boards Limited An Integrated Pulp, Paper and Paper board Mill at Pallipalayam, Erode, District Namakkal, Tamilnadu, India Production Capacity - 1,65,000 Tonnes https://www.spbltd.com/
	01:00 AM - 02:00 PM	Lunch
	02:00 PM - 04:30 PM	**Robotics and Automation in the Digital Factory**
		Resource Person: **Mr.M.Kumar** Director, alfaTKG Integrated Solutions India Pvt Ltd, Chennai
	04:30 PM - 05:30 PM	**Industry Automation (Practical Session)**
		Sensor and Actuator Integration, Human -Machine Interface, PLC Programming

FDP Schedule

Date	Time	Session
25.11.2023 **(Day 6)**	09:30 AM - 12:00 Noon	**IoT Integration and Smart Manufacturing**
		Resource Person: **Dr.M.Sreekumar,** Professor, Department of Mechanical Engineering, Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram
	12:00 Noon - 01:00 PM	**Reflection Journal**
	01:00 AM - 02:00 PM	Lunch
	02:00 PM - 04:00 PM	**Assessment, Feedback & Interaction**
	04:00 PM - 05:00 PM	Valedictory Session

Article Discussion Session

FDP attendees have to refer the state- of-the-art articles recommended by the organizing team from reputed journals in the field.

Teams (5-6 members per team) will be formed from the registered attendees
All teams read, discuss, and summarize their findings from the article.

Summary focus (2 pages per team):

>> **Key Principles/Practices** from the Article (3-4 bullets for the Team),
>> **Application of Principles/Practices** in your Function (Individual)
(Name with 3-4 lines write up bridging Theory with Practice)
>> **Key Takeaways** from the Article (3-4 bullets for the Team).

This team based structured reading, reflection, and summary will foster better retention of knowledge from good industry practices

Reflective Journal Session

The Reflective journal encourages FDP attendees to carry out introspection and reflection on what they have learned in the ATAL FDP with a focus on implementation of new learnings.

Individually, FDP attendees should submit a Reflective journal with a focus on
>> Identify **3 Key Learnings (Outcomes)** from the FDP,
>> List **3 Key Lessons (Concepts/Ideas)** that you will Implement
>> Share an Implementation Plan for your **3 Key Lessons** (Concepts)