



AICTE Training and Learning Bureau (ATAL)

ACADEMY Sponsored

One-Week Faculty Development Programme on
“3D Printed Composites: Materials, Technologies, and Applications”

8th December -13th December 2025

**Department of Applied Science and Humanities &
 Department of Computer Science & Engineering,
 Panipat Institute of Engineering & Technology,
 Samalkha, Panipat, Haryana (www.piet.co.in)**

3D printing, also known as additive manufacturing, has revolutionized the way we create and design complex structures. When it comes to composites, 3D printing is gaining significant attention due to its ability to produce high-performance materials with enhanced properties. 3D printed composites combine the versatility of traditional 3D printing with the strength and durability of composite materials, opening new opportunities in various industries. Materials in 3D Printed Composites: The materials used in 3D printed composites typically consist of a matrix material (usually thermoplastics) combined with reinforcing fibers or particles. The main categories of materials used in 3D printed composites include Polymer Matrix Composites (PMC). These composites are made of thermoplastic or thermosetting resins combined with reinforcing materials. Thermoplastics like PLA, ABS, PETG, and nylon are commonly used as matrices in 3D printing. In Metal Matrix Composites (MMC), metals like aluminum, titanium, or stainless steel are combined with reinforcing fibers or particles such as carbon or ceramic fibers. These composites offer high strength-to-weight

ratios, excellent thermal conductivity, and better resistance to high temperatures. 3D printing with metal matrix composites allows for the creation of complex geometries that are otherwise difficult to achieve using conventional methods. Ceramic Matrix Composites (CMC) consists of a ceramic matrix reinforced with fibers or particles, such as silicon carbide or carbon fibers. These materials offer high-temperature resistance, low thermal expansion, and excellent mechanical properties, making them ideal for aerospace and automotive applications.

3D printed composites represent the future of material fabrication, combining the flexibility of additive manufacturing with the strength and performance of composite materials. As innovations continue, these materials will play an increasingly significant role in industries ranging from aerospace to medical applications, providing custom solutions that meet the specific demands of various sectors.

Objectives of the FDP:

1. To introduce faculty to fundamental principles of 3D printing and composite materials, their types and properties.
2. To provide in-depth knowledge of advanced and hybrid composite materials used in 3D printing.
3. To familiarise faculty with key 3D printing technologies and their aptness for composite material fabrication.
4. To provide practical exposure to the faculty about the design, modelling and manufacturing of the composite material components
5. To acquaint faculty about contemporary and potential industrial applications of 3D printed composite materials in various industrial sectors like automotive, aerospace, biological and electronics sectors, etc.
6. To encourage faculty to undergo multidisciplinary research and work on innovative projects in the field of composite materials and additive manufacturing
7. To enable faculty to integrate 3D printing technology into the curriculum successfully and

motivate students in this domain.

8. To foster collaboration in industry and academia by sharing case studies and problems and challenges in industry and academia.
9. To make aware the faculty about sustainable composite materials, circular manufacturing, and potential of 4D printing and smart composites.
10. To strengthen proficiency among faculty members in design, simulation and slicing software, understanding material selection standards, and managing post-processing practices for composite structures.

Expert lectures will be delivered by eminent academicians, including (IITs, NITs, and other universities of international /national importance), leading industry professionals, etc.

This FDP will be beneficial to academicians, researchers, and industry professionals who are or intend to be in the material development domain.

ABOUT ATAL ACADEMY: The AICTE ATAL Academy (All India Council for Technical Education – AICTE Training and Learning Academy) is an initiative to enhance the skills of faculty members and students in technical institutions across. Its mission is to offer high-quality training programs in emerging technologies and fields like AIML, Quantum Computing, Industry 4.0 and 3D printing, etc.

The academy provides workshops, faculty development programs, and online courses, aiming to bridge the gap between industry requirements and academia. By fostering innovation and promoting research, ATAL Academy helps in improving the quality of technical education and encouraging lifelong learning.

ABOUT THE INSTITUTE: PIET is among the top engineering, pharmacy and management institutes of Haryana, and it is leading the way with the course curriculum in engineering, management, and pharmacy designed for Industry 4.0. PIET's Education 4.0, with its emphasis on analytics, AI, robotics, and other new-age learning frameworks, ensures that students are ready to face the world of tomorrow successfully. PIET is a multi-disciplinary

institute affiliated to Kurukshetra University, Kurukshetra. It is approved by AICTE and has been granted autonomous status by UGC, effective from Session 2024-25. The institute consistently places its graduates in top MNCs, blue-chip companies, and start-ups, demonstrating its commitment to developing new-age leaders with an integrated approach and futuristic orientation. Five programs (CSE, ECE, IT, MBA and MCA) are NBA accredited. The institute is accredited with A grade by NAAC.

Introduction to 3D Printing and Composites

3D printed composites represent an exciting fusion of advanced additive manufacturing technologies and engineered materials, offering vast potential across various industries. These materials combine the versatility of 3D printing with the superior mechanical, thermal, and electrical properties of composite materials, such as carbon fiber, glass fiber, and polymer matrices. The technology enables precise control over the material distribution, enhancing performance while reducing waste and production time.

Course Objectives:

1. To understand the basics of 3D printing technologies and composite materials.
2. To explore advanced materials and their integration into 3D printing processes.
3. To analyze the mechanical properties of 3D printed composites and their applications.
4. To investigate the role of 3D printed composites in key industries like aerospace, automotive, and healthcare.
5. To develop sustainable practices and environmentally-friendly solutions in 3D printing of composites.

OUTCOMES OF FDP: Having attended this FDP, the participants will show specific results, particularly with regard to knowledge of concepts and applications in the framework of 3D Printed Composites:

Enhanced Technical Knowledge related to fundamentals and advanced techniques of additive manufacturing and composite materials

Hands-on Training on various 3D printing methods (FDM, SLA, SLS) customized to various composite structures.

Application-Oriented Learning: Designed and analyzed composite structures for mechanical strength, thermal resistance and will be able to solve real-world problems.

Curriculum Enrichment: this FDP will equip faculty members to integrate 3D printing modules into existing courses and will be able to develop interdisciplinary teaching approaches combining material science, mechanical design, and digital manufacturing

This will help to develop Research & Innovation environment opportunities in 3D printed composites by identifying new research areas.

Industry-Academia Linkage: this FDP will aware faculty about current industrial trends and help in networking with industry and institutions for collaboration and consultancy.

Skill Up gradation for Outcome-Based Education (OBE): This FDP will help in enhancing ability to mentor students in capstone projects and start-ups in 3D printing ultimately resulting in acquaintance with tools that support National Education Policy (NEP) 2020 goals.

ORGANISING COMMITTEE

Chief Patrons

Sh. Hariom Tayal, Chairman, PIET
Sh. Suresh Tayal, Member Secretary, PIET
Sh. Rakesh Tayal, Vice Chairman, PIET
Sh. Shubham Tayal, Member BOG PIET

Patron(s)

Prof. (Dr.) Shakti Kumar, Director, PIET
Prof. (Dr.) J.S. Saini, Dean Engg., PIET
Prof. (Dr.) Vinay Khatri, HOD (ASH), PIET
Prof. (Dr.) S. C. Gupta, HOD (CSE), PIET
Prof. (Dr.) Anju Gandhi Coordinator, AICTE IDEALAB
Prof. (Dr.) Sunil Dhull, HOD, (MED). PIET

Coordinator

Dr. Vinod Kumari, Associate Professor, Department of

Applied Science and Humanities

Co-Coordinator

Dr. Stuti Mehla, Associate Professor, Department of Computer Science and Engineering

Convener(s)

Dr. Upasana Lakhina (CSE) Prof. Parsoon Kumar (ME)
Prof. Pardeep Kumar (ME) Prof. Sidharth Gandhi (ME)

IMPORTANT DATES

Last date for registration: 1 December, 2025.

Intimation of selection: 5 December, 2025.

Mode of Intimation: Through email only

Registration Fee: There is no registration fee for participants. Number of participants shall be limited to a maximum of 50 from higher engineering institutions within the same city or within 100 km from the host institution, on a first-come, first-served basis.

Who can participate?

- Faculty members from AICTE-approved institutions within 100 KM;
- Research scholars and PG students;
- Personnel from the government sector, research and development, and industries;
- School teachers and staff of host institution.

How to Apply: Candidates should register as 'candidate' at the AICTE-ATAL portal and select FDP titled "3D Printed Composites: Materials, Technologies, and Applications"

Register via web portal within the deadlines on:

<https://atalacademy.aicte-india.org/login>

As per policy of ATAL Programme, certificate of completion shall be awarded to those who will fulfil 75% attendance criteria and obtain 80 % marks in the test to be conducted on concluding day.

For more information, please

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