Post Graduate Program In Automotive Design & Analysis

About The IIT Jammu Certification Program
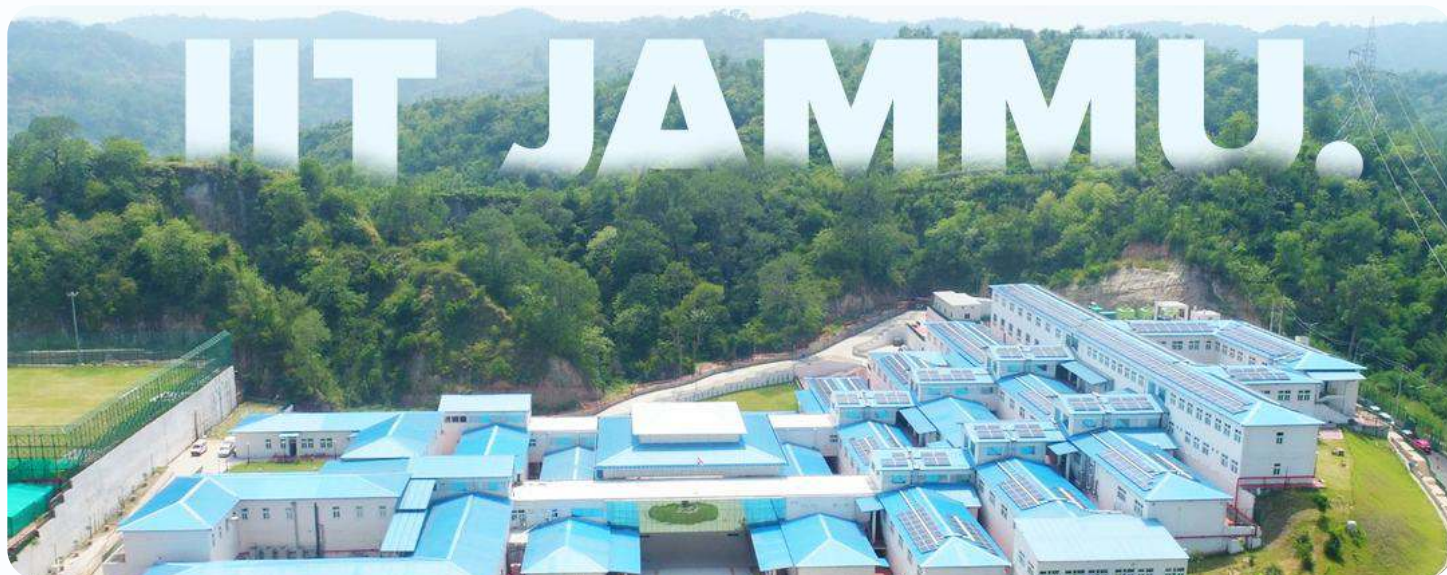
The **IIT Jammu Certification Program** is a collaborative initiative between **IIT Jammu and Skill-Lync,** created to address the growing gap between traditional engineering education and the evolving skill requirements of the automotive and mobility industry. It is a comprehensive program that covers both foundational principles and advanced concepts in **automotive design and CAE,** enabling learners to build practical, application-ready engineering capabilities.

India's automotive and mobility sector currently supports over **19 million** jobs and is projected to generate **more than 2 million additional engineering and technical roles by 2030.** As vehicles become more complex, employers increasingly seek engineers who can apply engineering principles within real production, validation, and regulatory environments, rather than limiting their expertise to conceptual or theoretical knowledge.

The program delivers an integrated learning experience that combines strong academic foundations with applied, industry-aligned training. Through structured, project-based learning, exposure to modern engineering tools, and guided problem-solving, learners develop industry-ready competencies aligned with real automotive engineering workflows, supported by **IIT Jammu certification and 100% placement assistance.**

IIT Jammu Certificate

The **IIT Jammu certification,** awarded as part of the **Post Graduate Program in Automotive Design & Analysis,** represents successful completion of a structured, academically guided learning journey aligned with institutional standards.

Issued in collaboration with **IIT Jammu,** the certification validates that the learner has met defined academic requirements and demonstrated applied competence in automotive design and CAE through evaluated coursework and projects. It adds formal academic weight to the program outcomes and enhances the credibility of a candidate's profile for core automotive and mechanical engineering roles.

What This Certification Represents

- Academic recognition from an Institute of National Importance
- Strong theoretical grounding aligned with institutional standards
- Industry-relevant learning evaluated through structured assessment
- Enhanced credibility during resume screening and interviews

Program Highlights

Career-Oriented Curriculum
Designed for mechanical engineers at different experience levels, aligned with real automotive job roles.

12-Month Industry-Focused Program
A structured 12-month learning journey mapped to OEM and Tier-1 engineering requirements.

Industry-Grade Projects
Build hands-on expertise with 35+ real-world automotive design and analysis projects.

Practical Challenges
Strengthen applied skills through 125 structured challenges covering core automotive concepts.

Automotive Design Tool Proficiency
Gain working knowledge of industry-standard automotive design and analysis software.

Career Readiness & Interview Support
Access career counselling, mock interviews, and interview opportunities, subject to eligibility.

Learn From IIT Faculty & Industry Experts
Sessions delivered by IIT faculty and experienced industry professionals, supported by live and recorded learning.

Who This Program Is Designed For

The automotive design ecosystem offers diverse career paths across design, development, manufacturing, and integration. This certification program is structured to support mechanical engineers at different career stages who aspire to build or strengthen careers in the automotive design and product development domain.

Who Can Benefit From This Program

Mechanical Engineering Graduates & Freshers
Looking to enter the automotive design domain with strong fundamentals, CAD proficiency, and industry-aligned project exposure.

Early-Career Engineers (0–2 Years Experience)
Design, production, or quality engineers aiming to transition into core automotive design roles such as plastic design, BIW, or wiring harness engineering.

Working Professionals (2–5 Years Experience)
Engineers seeking structured upskilling in automotive design workflows, tooling feasibility, and system-level understanding to move into specialized or higher-responsibility roles.

Experienced Engineers (5+ Years Experience)
Professionals looking to strengthen expertise in vehicle systems integration, component development, and design decision-making aligned with OEM standards.

Course Curriculum

1 Automotive Plastic Design Using CATIA V5

This module provides a comprehensive understanding of automotive plastic component design, covering materials, manufacturing processes, CATIA-based modeling, and tooling feasibility. Learners gain hands-on exposure to designing plastic trims that meet OEM standards for manufacturability, assembly, and quality.

Key Topics Covered:

- Plastics in automotive, material selection, thermosets & thermoplastics
- Injection molding process and manufacturing defects
- CATIA basics: Sketcher and Part Design workbench
- Surface design, draft analysis, tooling direction, and parting line creation

2 Automotive Sheet Metal Design Using Siemens NX CAD / CATIA V5

This module introduces the fundamentals of automotive sheet metal design and the vehicle development cycle. Learners understand BIW structures, closure panel design, safety requirements, and manufacturing constraints through real-world design methodologies and case studies.

Key Topics Covered:

- Vehicle development cycle and BIW fundamentals
- Steel properties and material selection
- Hood, fender, roof, door, and tailgate design methodology
- Gap & flushness, safety requirements, and case studies

Course Curriculum

3 Automotive BIW Fixture Design Using CATIA V5

This module focuses on the design of BIW welding fixtures used in automotive manufacturing. Learners understand fixture concepts, unit design, welding processes, and detailing practices followed on the shop floor.

Key Topics Covered:

- BIW fixture fundamentals and nomenclature
- Welding processes and 3-2-1 locating principle
- Fixture unit design: pin, clamp, rest, dump, slide, base units
- 2D detailing, GD&T basics, BOM and BOP documentation

4 Geometric Dimensioning And Tolerancing

This module builds strong competency in GD&T as per ASME standards. Learners develop the ability to apply tolerances correctly and interpret complex engineering drawings with functional intent

Key Topics Covered:

- GD&T fundamentals and ASME Y14.5 standards
- Datums, modifiers, MMC/LMC/RFS conditions
- Form, orientation, profile, and position tolerances
- Interpretation of complete GD&T drawings

Course Curriculum

5 Automotive Wiring Harness Using CATIA V5

This module covers end-to-end wiring harness design using CATIA V5 Electrical Workbench. Learners understand routing, packaging, flattening, and drawing creation practices followed in OEM vehicle programs.

Key Topics Covered:

- Vehicle electrical distribution system (EDS)
- Wiring harness routing and assembly workflow
- Electrical part design and component definition
- Harness flattening and 2D drawing creation

6 Preprocessor For Structural Analysis Using ANSA

This module introduces structural CAE preprocessing using ANSA. Learners gain hands-on experience in geometry cleanup, mid-surfacing, meshing, and connection modeling to prepare simulation-ready FE models.

Key Topics Covered:

- FEA basics and ANSA GUI
- Topology cleanup and mid-surfacing
- 2D and 3D meshing with quality criteria
- Connection modeling and morphing basics

Course Curriculum

7 LS-DYNA For Structural Mechanics/FEA

This module provides in-depth exposure to LS-DYNA solver concepts and workflows. Learners understand simulation setup, material modeling, contacts, timestep control, and post-processing techniques.

Key Topics Covered:

- Explicit and implicit simulation fundamentals
- LS-PrePost workflow and keyword structure
- Material models, contacts, and boundary conditions
- Best practices and result interpretation

8 Tolerance Stack-Up Analysis

This course offers an in-depth understanding of tolerance stack-up analysis, focusing on dimensional and geometric tolerances. It emphasizes analytical methods, statistical approaches, and software tools for evaluating assembly performance and improving product quality.

Course Curriculum

9 Benchmarking And Costing

A comprehensive understanding of product benchmarking and cost estimation — two critical pillars of new product development (NPD) and value engineering. Through structured video lessons, real-world teardown examples, and competitive analysis exercises, learners will gain the ability to evaluate competing products, derive cost insights, and optimize designs for performance and manufacturability.

10 Automotive Class A Surfacing Using ALIAS

This module develops Class-A surfacing skills required for automotive design. Learners progress from curve creation to surface evaluation, continuity control, and presentation-ready surfacing.

Key Topics Covered:

- ALIAS interface and curve fundamentals
- Surface creation and patch layout
- G0/G1/G2/G3 continuity management
- Surface evaluation and rendering basics

Course Curriculum

11 Engineering Basics With DFM&A

Deepen your understanding of engineering principles while optimizing designs for efficient manufacturing processes.

12 Sheet Metal And Welding Process

Understand the techniques and processes for forming sheet metal and welding, crucial for mechanical manufacturing.

13 Crashworthiness Analysis Using HyperMesh And Radioss

This module focuses on crashworthiness CAE workflows using HyperMesh and Radioss. Learners understand how vehicle structures are modeled, simulated, and evaluated against crash safety standards.

Key Topics Covered:

- Crashworthiness fundamentals and CAE process
- Geometry cleanup and meshing in HyperMesh
- Material and contact modeling in Radioss
- Simulation control, post-processing, and standards

Projects

① Automotive Plastic Design Using CATIA V5

In these projects, students design key automotive plastic trim components - including coin holder, heat staking features, switch bezel, B-pillar cover, and side door panel - using given Class-A surfaces and design inputs. The focus is on manufacturability, proper mounting strategies, sub-assembly integration, and industry-standard plastic design practices.

- ✓ Design of Coin Holder
- ✓ Design of Heat Staking
- ✓ Design of Switch Bezel
- ✓ Design of Side door Panel
- ✓ Design of B-pillar Cover

② Automotive Sheet Metal Design Using Siemens NX CAD / CATIA V5

In these projects, students design and develop major BIW panels and assemblies-including hood inner panel, fender drip area, roof assembly, and tailgate-based on given styling data and automotive standards such as EURO NCAP. The focus is on structural design, reinforcement strategy, safety compliance, and manufacturability.

- ✓ Designing of Hood
- ✓ Designing of Roof Assembly
- ✓ Designing of Fender Drip Area
- ✓ Designing of Tailgate

Projects

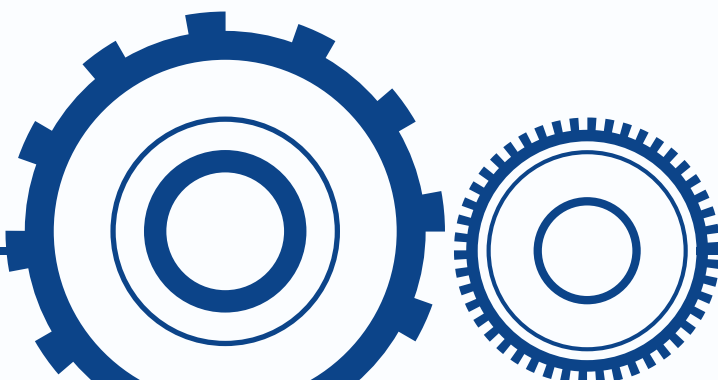## ❸ Automotive BIW Fixture Design Using CATIA V5

Robot & Manual Welding Fixture Design Project

In this project, students design and develop both robotic and manual welding fixtures, focusing on industry-standard fixture concepts and workflows. The project includes complete 3D assembly creation along with detailed child-part drawings for manufacturing and documentation.

- ✔ Designing a Robot Welding Fixture
- ✔ Designing a Manual Welding Fixture

❹ Geometric Dimensioning And Tolerancing Butterfly Valve Design

In this project, you will learn about GD&T and its application for Butterfly valve assembly.

Projects

❺ Automotive Wiring Harness Design Using CATIA V5

Engine & Car Body Wiring Harness Design Project

In this project, students design wiring harnesses for both the engine and car body, following industry-standard routing and packaging practices. The project covers harness routing, flattening, and creation of detailed 2D drawings for manufacturing and documentation.

- ✓ Wiring Harness on Engine
- ✓ Wiring Harness on Car Body

❻ Preprocessor For Structural Analysis Using ANSA

In these projects, students model an automotive IP trim component from a given substrate and develop a complete suspension assembly while validating part connections. The focus is on accurate CAD modeling, assembly structure, and adherence to automotive design practices.

- ✓ Modeling of an Automotive IP Trim Component
- ✓ Modeling of an Automotive Suspension Assembly

❼ LS-DYNA For Structural Mechanics/FEA

In these projects, students will simulate the pedestrian head impact on the hood thus analysing the results for calculating the HIC value and also set up the case for a bird strike on an aircraft engine using shell elements.

- ✔ Pedestrian Head Impact Simulation on a Hood
- ✔ Bird Strike on an Aircraft Engine using Shell Elements
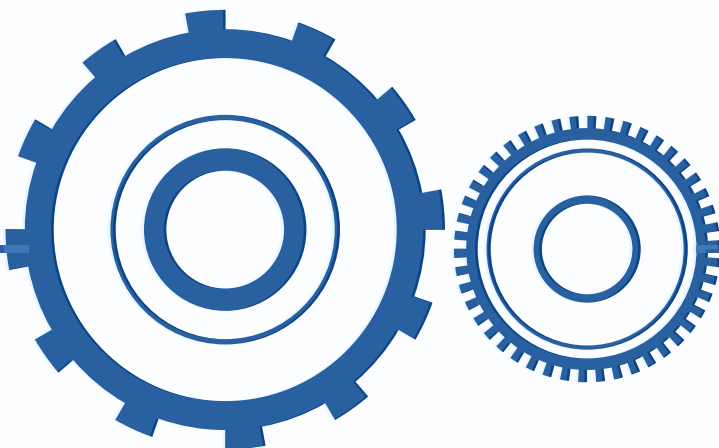
What Our Learners Say

"My mentor inspired me to approach design with clarity and purpose. The guidance helped me build the right mindset to design thoughtfully and confidently."

Lijith V M - Design Engineer, Tata Elxsi

"The course structure and faculty support helped me learn and grow far beyond my expectations."

Madhav Gophane - Product Design Engineer, Pucha Engineers Pvt. Ltd.

"This program gave me the opportunity to work with modern design tools and apply them in a real engineering environment."

Sathishkumar M - Design Engineer, L&T Technology Services

"Learning tools like CATIA, NX CAD, and SolidWorks helped me upskill and align my skills with industry standards."

Bishwajeet Singh - Design Engineer, Expleo

"The engineering knowledge gained through this program helped bridge the gap between academic learning and industry requirements."

Prabhat Ranjan - Mechanical Drafter, Thermax Limited