# In-house Product Development (IPD)

## 1. Introduction

The **Naresh Vashisht Centre for Tinkering and Innovation (NVCTI)** at IIT (ISM) Dhanbad is a central hub for innovation, experimentation, and product-oriented learning. The **In-house Product Development (IPD)** initiative provides a dedicated platform for students and faculty to conceptualize, develop, and prototype technological solutions that address real-world challenges.

## 2. Objective of IPD

The primary aims of the IPD program are:

- To provide hands-on experience in designing and developing functional products.
- To encourage innovation and technical problem-solving among students.
- To support product-oriented research and foster a culture of making.
- To lay the foundation for entrepreneurship and startup creation.

## 3. Scope of IPD

In-house Product Development at NVCTI, IIT (ISM) Dhanbad, focuses on fostering innovation across a curated set of technical domains, while also remaining open to novel ideas in emerging fields. The core areas currently supported under IPD include:

**a. Electronics and Internet of Things (IoT)**

Design and development of smart systems involving microcontrollers, sensors, actuators, and communication protocols for applications such as home automation, environmental monitoring, and industrial control.

**b. Animation and Game Design**

Creation of interactive digital content including 2D/3D animations, educational and simulation-based games, and immersive experiences using AR/VR, aimed at entertainment, learning, or training.

**c. Mechanical and Rapid Prototyping**

Engineering and fabrication of mechanical systems and components using CAD modeling, 3D printing, laser cutting, and CNC machining for rapid development and functional testing of hardware solutions.

**d. Pouch Battery Cell Assembly Unit**

Design, assembly, and testing of lithium-based pouch cells and battery modules, supporting innovation in portable energy storage and sustainable power solutions.

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**e. Other Fields of Innovation and Technology**

NVCTI encourages interdisciplinary and unconventional ideas that fall outside the above domains but demonstrate strong potential for innovation, societal impact, or technological advancement. This includes, but is not limited to, areas such as AI/ML integration, biomedical devices, green technologies, space-tech concepts, and smart materials.

## 4. Key Features

- **Idea to Prototype Journey:** Structured support from ideation to working model.
- **Technical Mentorship:** Domain-specific guidance from faculty, industry experts, and alumni mentors.
- **Funding & Resources:** Access to tools, components, and seed funding for materials and prototyping.
- **Skill-building Workshops:** Training in microcontroller programming, CAD modeling, battery technology, and animation tools.
- **IP & Commercialization Support:** Assistance in filing patents and scaling viable projects toward startup incubation.

## 5. Process Flow of IPD

1. **Call for Proposals**: NVCTI issues periodic calls for product ideas.
2. **Screening & Evaluation**: Projects are reviewed by an expert panel.
3. **Prototype Development**: Approved teams work in NVCTI labs to build prototypes.
4. **Review & Iteration**: Regular progress evaluations and feedback sessions.
5. **Showcasing & Support**: Final prototypes are displayed during expos and may receive further incubation or industry linkage.