

DYSMECH COMPETENCY SERVICES PVT. LTD.
PRODUCT DEVELOPMENT AT INVERTIS UNIVERSITY
SMART ENERGY METER

ABOUT DYSMECH

Dysmech Competency Services Pvt. Ltd. (DCS) founded in 2000, bags to its name a charismatic aggregation of professionals from diverse verticals, excelling the four Pillars that help flourishing business and taking it to newer horizons. Beneath the advisory ship of Mr. Vijay Kumar, a prominent IIT (Kharagpur) alumnus possessing extensive exposure and experience in the industrial world, the company's management has been honoured and dignified to place the company as one of the leading consultants in India with its nationwide presence in more than 15 cities.

The company pursues, as its aim to use the experience gained by its personnel & skilled experts to service clients maintaining high standards of quality while respecting time schedules.

Company Website: <http://dysmech.com/>

PRODUCT DEVELOPMENT INVITATION LETTER

Dear Students,

We are excited to invite you to participate in an interdisciplinary Product Development Program focused on the development of a Smart Single-Phase Energy Meter. This program offers a hands-on learning experience in IoT-based energy monitoring, real-time data analytics, and smart metering solutions, preparing students for careers in technology, smart systems, and energy management.

With the increasing emphasis on energy conservation and cost optimization, this project will provide practical exposure to building a real-time energy monitoring and management system. Participants will work with cutting-edge technologies, including IoT sensors, cloud platforms, and data visualization tools, to develop a fully functional smart meter capable of tracking energy usage, detecting anomalies, and dynamically calculating electricity bills.

This program is open to students from various disciplines, including B.Tech, BCA, and MCA, allowing them to collaborate and contribute their expertise in different aspects of the project.

SMART SINGLE-PHASE ENERGY METER

1. OBJECTIVE

The Smart Single-Phase Energy Meter aims to provide an advanced, real-time monitoring system that helps consumers track their electricity usage, understand cost variations based on slab rates, and detect anomalies in electrical parameters. The system will be integrated with the IoT Cloud platform, allowing users to access energy consumption data through web and mobile dashboards. Additionally, it will feature live electric bill calculations, providing users with real-time updates on their current energy expenses based on dynamic tariff structures.

The project emphasizes IoT-based automation, anomaly detection, and data-driven insights to help users optimize energy consumption and prevent potential issues.

2. Involvement of Different Engineering Departments

B.Tech (Engineering Branches):

1. Embedded Systems & Hardware Integration:

- 1.1. Design and develop the smart meter hardware using energy monitoring sensors.
- 1.2. Integrate voltage, current, and power factor sensors with microcontrollers for real-time data processing.

2. Energy Management & Optimization:

- 2.1. Implement algorithms for efficient energy tracking and consumption optimization.
- 2.2. Develop methods to minimize electricity wastage and enhance user cost savings.

B.Tech/BCA/MCA Students:**1. IoT Cloud Connectivity & Real-Time Data Transmission:**

- 1.1. Develop cloud-based connectivity to send and store energy data on the IoT Cloud platform.
- 1.2. Ensure seamless remote monitoring and control of energy consumption.

2. Data Analytics & Anomaly Detection:

- 2.1. Implement anomaly detection techniques to identify irregular voltage, current fluctuations, and faulty energy patterns.
- 2.2. Analyze historical data to provide predictive insights on energy consumption trends.

3. Web & Mobile Application Development:

- 3.1. Develop a user-friendly dashboard for real-time monitoring and billing calculations.
- 3.2. Create a mobile app with features like live electricity bill tracking, consumption alerts, and energy-saving recommendations.

3. Students' Learning Outcomes

By participating in this program, students will gain valuable skills in:

1. Embedded Systems & Hardware Development

- 1.1. Understanding smart energy meter architecture and sensor integration.

1.2. Working with microcontrollers for real-time power monitoring.

2. **Energy Management & Cost Optimization**

2.1. Implementing techniques to optimize power usage and reduce energy costs.

2.2. Understanding electricity tariff structures and slab-based billing models.

3. **IoT Cloud Connectivity & Data Transmission**

3.1. Developing cloud-based energy monitoring solutions with real-time updates.

3.2. Integrating sensors with cloud platforms like IoT Cloud.

4. **Anomaly Detection & Predictive Analytics**

4.1. Using data analytics to detect unusual patterns in power usage.

4.2. Applying machine learning techniques for predictive maintenance.

5. **Web & Mobile App Development**

5.1. Designing intuitive dashboards for energy tracking and billing insights.

5.2. Enabling remote monitoring via mobile applications.

4. **Relevance with Industry & Job Opportunities**

This product development program will equip students with in-demand industry skills relevant to:

1. **Smart Energy Management & Utilities**

1.1. Opportunities in developing smart energy meters, home automation, and smart grid solutions.

2. **IoT & Embedded Systems**

2.1. Careers in designing IoT-based energy monitoring systems and embedded technology solutions.

3. **Data Analytics & AI for Energy Optimization**

3.1. Roles in energy analytics, predictive maintenance, and AI-driven smart metering solutions.

4. Software Development & Full-Stack Engineering

- 4.1. Web and mobile application development for real-time system monitoring and billing automation.
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5. Conclusion

The Smart Single-Phase Energy Meter Product Development Program is a collaborative initiative designed to foster hands-on learning and innovation. By participating, students will work on cutting-edge technologies in IoT, energy monitoring, automation, and data analytics, gaining valuable experience that enhances their employability in rapidly growing industries.

We invite you to be a part of this exciting program and contribute to the future of smart energy management and cost-effective power usage.

Join us in shaping the future of smart energy systems!

6. Revenue Potential

The product developed through this project could generate billings of approximately ₹ 5,00,000.00 to ₹ 6,00,000.00 for Invertis University.

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SMART ENERGY METER
PRODUCT DEVELOPMENT ROAD MAP

INVERTIS CSED SMART ENERGY METER

PRODUCT DEVELOPMENT ROAD MAP

DCS Mentor : Mr. Manab Das

Approximate Product Timeline : 60 Working Days

TASK	LINE OF ACTION	ORGANISER	ASSIGNED DAYS
1	Team Discussion – Industry Standard Product Development & Applications Meeting – CSED Management, Assigned Invertis Staff & DCS Mentors	Talha Khan	1
2	List of Students Interested to Join	Talha Khan	7
3	Team Formation Meeting – Students, Assigned Invertis Staff & DCS Mentors	Avadhesh Sharma	2
4	Web Research & Practical Visit to all Departments Power Distribution Boards, Access to College Electric Bills- To Study & Understand User Challenges and Smart Requirements	Talha Khan	3
5	Smart Energy Meter – Market Standards, Requirements, Product Design & Smart Features	Mani Shankar (DCS)	2
6	Smart Energy Meter – Research on Required Hardware Materials	Nazmul (DCS)	2
7	Smart Energy Meter - Product Development Planning, Road Map, Task Breakup & Timeline Sheet (Meeting with Team)	Mani Shankar (DCS)	3
8	Smart Energy Meter – Data Science Model Building – Analytics on Collected Sensors Data, Generate Visual Reports, Trigger Alerts, predict trends & suggest automation responses.	Mr Kuldeep Verma / Hitesh (DCS)	15
9	Permission to Work on Campus Buildings MCB Panels/Power Distribution Boards (Need Electrician Help) - Feasibility Study, Install IoT Devices in Power Distribution Boards, Provide Wi-Fi Range to IoT Device.	Talha Khan	2

10	Compose Hardware & Software Requirements BOM	Mani Shankar (DCS)	1
11	Invertis CSED - BOM Approval - Place Order	Avadhesh Sharma	1
12	Hardware BOM – Delivery to Invertis Campus	Avadhesh Sharma	15
13	Phase 1 (IoT & Data Science) Task & Timeline Execution	Avadhesh Sharma/ Nazmul (DCS)	20
14	Device Enclosures & Mechanical Fixtures - 3D Design & Manufacturing	Sandeep (DCS)	10
15	Install IoT Smart Energy Meter inside Campus Power Distribution Boards, Testing, Validation & Documentation Electrician Requirement – Invertis CSED Need to Arrange	Manab Das (DCS)	4
16	Team Discussion on Mobile Application Features Meeting – Students, Assigned Invertis Staff & DCS Mentors	Chaudhary Ravi Singh	1
17	Mobile/Web application Requirements, Task Breakup & Timeline	Mani Shankar (DCS)	2
18	Compose App Development Software & Paid Subscriptions Budgeting	Rushikesh Pande (DCS)	2
19	Invertis CSED - Purchase Approval - Place Order	Chaudhary Ravi Singh	1
20	Phase 2 (Mobile App) Task & Timeline Execution	Chaudhary Ravi Singh/ Rushikesh Pande (DCS)	20
21	Final Product Testing	Manab Das (DCS)	4
22	Product Validation	Mani Shankar (DCS)	2

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SMART ENERGY METER

TEAM FORMATION

**INVERTIS CSED SMART ENERGY METER
PRODUCT DEVELOPMENT
TEAM FORMATION**

Sr. No	PRODUCT DEVELOPMENT STAGES	STUDENTS		STUDENTS	MENTORS
		BRANCH	CSED PREREQUISITE		
1	IOT APPLICATION DEVELOPMENT	B. Tech (EE, ETC)	IT_1	5	DCS MENTOR MR. Manab Das INVERTIS Mr. Ratnesh Pandey, CSE Department
2	DEVICE ENCLOSURE – DESIGN & MANUFACTURING	B. Tech (Mech)	Module 1 & 2	5	
3	DATA SCIENCE MODEL DEVELOPMENT	B. Tech, BCA	IT_5 & IT_6	5	
4	APPLICATION DEVELOPMENT	B. Tech, BCA, MCA	IT_5	5	

1. IOT APPLICATION DEVELOPMENT

Sr. No	STUDENT NAME	BATCH	CONTACT
1			
2			
3			
4			
5			

2. DEVICE ENCLOSURE – DESIGN & MANUFACTURING

Sr. No	STUDENT NAME	BATCH	CONTACT
1			
2			
3			
4			
5			

3. DATA SCIENCE MODEL DEVELOPMENT

Sr. No	STUDENT NAME	BATCH	CONTACT
1			
2			
3			
4			
5			

4. APPLICATION DEVELOPMENT

Sr. No	STUDENT NAME	BATCH	CONTACT
1			
2			
3			
4			
5			