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DYSMECH COMPETENCY SERVICES PVT. LTD.

PRODUCT DEVELOPMENT AT INVERTIS UNIVERSITY

SMART INDOOR AQI MONITORING

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/

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PRODUCT DEVELOPMENT INVITATION LETTER

Dear Students,

We are excited to invite you to participate in a ground breaking Product Development Program focused on the development and deployment of a Smart Indoor Air Quality Index (AQI) Monitoring Device. This interdisciplinary program provides a unique opportunity to gain hands-on experience in IoT system development, sensor integration, smart automation, and cloud-based data analytics.

The Smart Indoor AQI Monitoring Device will be designed to measure temperature, humidity, Volatile Organic Compounds (VOC), and CO_2 levels using advanced sensors such as DHT11, VOC, and CO_2 sensors. The device will feature an OLED screen for real-time display and Things Board Cloud Platform for remote monitoring and data analytics. Additionally, a custom mobile application will provide users with real-time alerts, automation triggers, and seamless integration with smart appliances like air conditioners, air purifiers, fans, and more.

As environmental concerns and air quality management become crucial for human well-being, this program will equip you with industry-relevant skills and prepare you for exciting career opportunities in IoT, environmental technology, and smart home automation.

SMART INDOOR AIR QUALITY MONITORING DEVICE

1. OBJECTIVE

This program aims to provide an interdisciplinary learning experience in developing and implementing a smart air quality monitoring system. The project integrates multiple fields, including IoT-based automation, real-time data analysis, and smart home integration.

Key objectives include:

1. **IoT Skill Development** – Hands-on experience in sensor integration and cloud-based data management.

2. **Environmental Monitoring** – Utilizing DHT11, VOC, and CO_2 sensors to assess indoor air quality.

3. **Data Visualization & Analysis** – Displaying real-time data on an OLED screen and Things Board Cloud for monitoring trends.

4. **Smart Automation Integration** – Enabling customized triggers for smart home devices based on air quality metrics.

5. **Health & Comfort Optimization** – Ensuring healthy indoor environments in various settings, including homes, offices, hotels, convocation halls, restrooms, and hospitals.

6. **User-Centric Design** – Emphasizing an intuitive user interface for seamless access and monitoring.

7. **Real-World Application** – Preparing students for career roles in IoT, environmental monitoring, and smart automation.

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2. INTERDISCIPLINARY DEPARTMENT

B.Tech (Engineering Branches):

1. **Embedded Systems & Hardware Development:** Work on sensor integration, microcontroller programming, and real-time data acquisition.

2. **Energy Efficiency & Optimization:** Design power-efficient solutions for continuous device operation.

B.Tech/BCA/MCA Students:

1. **IoT Cloud Connectivity:** Develop cloud-based infrastructure for storing and analysing air quality data.

2. **Data Analytics & Machine Learning:** Use historical and real-time data to predict air quality trends and suggest automation responses.

3. **Smart Automation & Real-Time Triggers:** Implement automation rules for smart home devices based on AQI levels.

B.Tech/BCA/MCA Students:

1. **Web & Mobile Application Development:** Create a user-friendly mobile app for real-time monitoring, alert notifications, and smart appliance control.

2. **Data Visualization & Backend Development:** Develop dashboards to present indoor air quality insights and generate analytical reports.

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3. STUDENT LEARNING OUTCOMES

By participating in this Product Development Program, students will acquire key industry skills in:

1. **Embedded Systems & Hardware Development:**
   1.1. Hands-on experience with ESP32, DHT11, VOC, and CO2 sensors.
   1.2. Real-time data acquisition and processing.

2. **IoT & Cloud Connectivity:**
   2.1. Building IoT-enabled air quality monitoring systems.
   2.2. Transmitting and analysing data on Things Board Cloud.

3. **Data Analytics & Machine Learning:**
   3.1. Developing predictive models for air quality fluctuations.
   3.2. Implementing data-driven insights for automation.

4. **Smart Home & Real-Time Automation:**
   4.1. Designing automation routines for air purifiers, fans, and HVAC systems.
   4.2. Enabling custom alerts and triggers for air quality optimization.

5. **Web & Mobile App Development:**
   5.1. Full-stack IoT application development.
   5.2. Creating interactive dashboards for real-time monitoring and control.

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4. INDUSTRY JOB SCOPE

This program equips students with job-ready skills applicable to several industries:

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1. **IoT & Smart Home Industry:**

   1.1. Development of connected home devices and automation solutions.

2. **Environmental Monitoring & Sustainability:**

   2.1. Designing air quality management systems for homes, offices, and industries.

3. **Embedded Systems & IoT Hardware Development:**

   3.1. Roles in sensor integration, microcontroller programming, and edge computing.

4. **Software Development & Data Analytics:**

   4.1. Positions in IoT software engineering, cloud computing, and predictive analytics.

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5. CONCLUSION

The Smart Indoor Air Quality Monitoring Device Product Development Program is a collaborative effort designed to empower students with practical experience in IoT, automation, and environmental monitoring. Through this initiative, participants will develop real-world solutions, gaining hands-on exposure to state-of-the-art technologies and enhancing their employability in emerging industries.

We invite you to join this exciting program and be part of the future of smart home automation and environmental technology.

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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 INDOOR AIR QUALITY MONITORING
PRODUCT DEVELOPMENT ROAD MAP

INVERTIS CSED SMART INDOOR AIR QUALITY MONITORING DEVICE

PRODUCT DEVELOPMENT ROAD MAP

DCS Mentor   : Mr. NAZMUL ARIFEN

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 Campus, Highway & City Street Lighting System - To Study & Understand User Challenges and Smart Requirements	Talha Khan	3
5	Indoor AQI Monitoring Device – Market Standards, Requirements, Product Design & Smart Features	Mani Shankar (DCS)	2
6	Indoor AQI Monitoring Device – Research on Required Hardware Materials	Nazmul (DCS)	4
7	Indoor AQI Monitoring Device - Product Development Planning, Road Map, Task Breakup & Timeline Sheet (Meeting with Team)	Mani Shankar (DCS)	3

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8	Indoor AQI Monitoring Device – Data Science Model Building – Analytics on Collected Sensors Data, Generate Visual Reports, predict trends and suggest automation responses.	Mr Kuldeep Verma / Hitesh (DCS)	15
9	Permission to Work on Campus/Conference Halls/Auditorium-Feasibility Study, Install IoT Devices in Campus, 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 AQI Device inside Campus, Testing, Validation & Documentation Electrician Requirement – Invertis CSED Need to Arrange	Nazmul (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	Rahul Chaple (DCS)	4
22	Product Validation	Mani Shankar (DCS)	2

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SMART INDOOR AQI MONITORING
PRODUCT DEVELOPMENT
TEAM FORMATION

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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. Nazmul **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			

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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			

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