DYSMECH COMPETENCY SERVICES PVT. LTD.

PRODUCT DEVELOPMENT AT INVERTIS UNIVERSITY

SMART AUTONOMOUS EV

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 announce an incredible opportunity for you to be part of an innovative and interdisciplinary Product Development program centred on the development of a Smart Autonomous Electric Vehicle (EV). This internship will offer hands-on experience in working with cutting-edge technologies, including Battery Management Systems (BMS), RFID-based security, GPS-based speed and distance tracking, Geofencing, and Computer Vision-based self-driving using Deep Learning.

This program is designed to engage students across various branches, including B.Tech, BCA, and MCA, and will involve collaboration across disciplines to successfully implement the project. As the automotive industry evolves toward electrification and autonomy, this internship will equip you with industry-relevant skills and prepare you for exciting career opportunities in these rapidly growing fields.

We invite enthusiastic and talented students to take part in this project, where you will have the chance to work on real-world engineering problems, develop innovative solutions, and collaborate in teams to bring this autonomous vehicle project to life.

SMART AUTONOMOUS EV

1. OBJECTIVE

The Smart Autonomous EV internship aims to provide an in-depth, interdisciplinary learning experience that focuses on designing and implementing a commercially viable autonomous electric vehicle. The project incorporates multiple aspects such as Battery Management Systems (BMS), RFID-based vehicle security, GPS-based speed and distance tracking, Geofencing, and Computer Vision-based autonomous driving.

This internship program involves collaboration among different departments, offering students the opportunity to specialize in their areas of interest while working together to deliver a fully functioning autonomous EV.

2. Involvement of Different Engineering Departments

1. **B.Tech (Engineering Branches)**:

   1.1. **Embedded Systems Development & Hardware Design**: Students will focus on integrating hardware components, including sensors and RFID modules, with embedded systems to enable real-time data collection and control.

   1.2. **Battery Management System (BMS)**: Electronics students will work on monitoring and managing the health, charging cycles, and thermal regulation of the battery pack, optimizing its performance and lifespan.

2. **B.Tech/BCA/MCA Students**:

   2.1. **IoT Cloud Connectivity**: Computer science students will develop cloud-based systems to transmit and monitor real-time vehicle data (e.g., location, battery status, security alerts) using industry-standard IoT protocols.

   2.2. **Data Analytics & Machine Learning**: BCA/MCA students will focus on building predictive models using real-time and historical data to enhance vehicle performance, improve battery efficiency, and predict maintenance needs.

   2.3. **Computer Vision**: They will also lead the implementation of computer vision algorithms for object detection, lane detection, and obstacle avoidance using tools such as OpenCV, Tensor Flow, and deep learning frameworks.

3. **B.Tech/BCA/MCA Students**:

   3.1. **Web and Mobile App Development**: B.Tech, BCA and MCA students will focus on developing user-friendly web and mobile applications for vehicle monitoring, control, and real-time data visualization. These apps will interface with the vehicle's IoT systems and provide features such as remote tracking, geofencing alerts, and driving analytics.

   3.2. **Data Visualization & Backend Development**: MCA students can contribute to the development of dashboards that display real-time data insights, generate reports, and support backend systems for handling vehicle data from various sensors.

4. Students Learning Outcomes

By participating in this internship program, students will develop critical skills in the following areas:

1. **Embedded Systems & Hardware Development**

   1.1. Learn how to design and implement embedded systems using microcontrollers, sensors, and real-time data communication protocols.

   1.2. Gain expertise in hardware integration for BMS, RFID, and GPS systems.

2. **Battery Management Systems (BMS)**

   2.1. Develop knowledge in monitoring battery health, optimizing battery performance, and designing BMS solutions that ensure efficiency and longevity.

3. **RFID-Based Security Systems**

   3.1. Gain hands-on experience in implementing secure access systems using RFID technology for vehicle authentication and data logging.

4. **IoT Cloud Connectivity**

   4.1. Learn how to build IoT systems that transmit vehicle data to the cloud in real-time, ensuring seamless monitoring and analysis.

5. **Data Analytics & Machine Learning**

   5.1. Gain proficiency in analysing large datasets and developing machine learning models for predictive maintenance, battery optimization, and performance improvements.

6. **Computer Vision**

   6.1. Work on implementing computer vision techniques to build autonomous driving systems capable of object detection, lane keeping, and obstacle avoidance using deep learning models.

7. **Web and Mobile Application Development**

   7.1. Learn full-stack development by building interactive, real-time web and mobile applications for controlling and monitoring the vehicle.

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5. Relevance with Placements and Industry Skills

This internship provides practical, real-world skills that are highly valued in the following industries:

1. **Automotive Engineering & Electric Vehicle Development**

   1.1. Opportunities in electric vehicle design, BMS development, and autonomous driving technologies.

2. **Embedded Systems & IoT**

   2.1. Skills in sensor integration, real-time data transmission, and cloud-based monitoring will prepare students for careers in IoT, smart devices, and connected systems.

3. **Data Science & AI**

   3.1. Practical experience in data analytics and machine learning models will open doors to careers in data science, AI, and predictive analytics for automotive and smart systems.

4. **Full-Stack Development**

   4.1. Web and mobile development skills are essential for software engineering roles, particularly in industries that focus on real-time system control and monitoring.

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6. Conclusion

The Smart Autonomous EV Internship Program is a collaborative effort that brings together students from multiple disciplines, allowing them to apply their knowledge in real-world scenarios. Participants will work on state-of-the-art technologies in embedded systems, IoT, machine learning, computer vision, and software development, gaining valuable skills and experience that will enhance their employability in the evolving fields of electric vehicles, AI, and smart technologies.

We invite you to join this unique program and be part of the future of autonomous electric vehicles.

7. Revenue Potential

The product like battery management system, charge monitoring and location tracking developed through this project could generate billings of approximately ₹ 9,00,000.00 to ₹ 10,00,000.00 for Invertis University.

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SMART AUTONOMOUS EV – RESEARCH & PRODUCT
DEVELOPMENT ROAD MAP

INVERTIS CSED SMART AUTONOMOUS EV

RESEARCH & PRODUCT DEVELOPMENT ROAD MAP

DCS Mentor : Mr. Nazmul A

Approximate Product Timeline : 120 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 – Product Development Stages Meeting – Students, Assigned Invertis Staff & DCS Mentors	Avadhesh Sharma	2
4	Invertis Management help to connect with EV 3-wheeler Auto Vendor/OEM – To Study & Understand User Challenges and Smart Requirements	Talha Khan	3
5	CSED Golf Cart (EV) – Market Requirements, Product Design & Features	Mani Shankar (DCS)	3
6	CSED Golf Cart (EV) – Study, Research & Requirements on Self Driving System Integration	Teja (DCS) /Nazmul (DCS)	20
7	CSED Golf Cart (EV) Product Development Planning, Road Map, Task Breakup & Timeline Sheet	Mani Shankar (DCS)	4
8	Permission to Work on CSED Golf Cart (EV) - Feasibility Study, Deploy Sensors, Test Run EV	Talha Khan	2
9	CSED Golf Cart (EV) – Current Technical Specifications, Features & Requirements to Start – Submit Report	Nazmul (DCS)	2
10	Compose Hardware & Software Requirements BOM	Mani Shankar (DCS)	4

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11	Invertis CSED - BOM Approval - Place Order	Avadhesh Sharma	1
12	Hardware BOM – Delivery to Invertis Campus	Avadhesh Sharma	20
13	**Phase 1 (IoT & Cloud Connectivity) Task & Timeline Execution**	Avadhesh Sharma/ Nazmul (DCS)	30
14	Get A post-paid Airtel Sim card – Device 4G Connectivity	Avadhesh Sharma	1
15	Device Enclosures & Mechanical Fixtures - 3D Design & Manufacturing	Sandeep (DCS)	20
16	Fix Devices On EV, Testing, Validation & Documentation	Nazmul (DCS)	10
17	CSED Golf Cart EV – Autonomous Self Driving System Integration – Documentation, Planning, Task & Timeline	Nazmul (DCS)	10
18	Compose Hardware, Software & Tools Requirements BOM	Mani Shankar (DCS)	5
19	Invertis CSED - BOM Approval - Place Order	Avadhesh Sharma	1
20	Hardware BOM – Delivery to Invertis Campus	Avadhesh Sharma	20
21	**Phase 2 (Autonomous Self Driving System R & D) Task & Timeline Execution**	Nazmul (DCS)	60
22	Team Discussion on Mobile Application Features Meeting – Students, Assigned Invertis Staff & DCS Mentors	Chaudhary Ravi Singh	2
23	Mobile/Web application Requirements, Task Breakup & Timeline	Mani Shankar (DCS)	4
24	Compose App Development Software & Paid Subscriptions Budgeting	Rushikesh Pande (DCS)	4
25	Invertis CSED - Purchase Approval - Place Order	Chaudhary Ravi Singh	1

26	**Phase 3 (Mobile App) Task & Timeline Execution**	Chaudhary Ravi Singh/ Rushikesh Pande (DCS)	60
27	Daily Test Run EV for Minimum 1 Hrs. in Autonomous Mode	Chaudhary Ravi Singh	30
28	Integrate IoT, Cloud, Self-Driving, Data Science & Mobile App	Chaudhary Ravi Singh	15
29	Final Product Testing	Nazmul (DCS)	5
30	Product Validation	Mani Shankar (DCS)	5

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SMART AUTONOMOUS EV – PRODUCT DEVELOPMENT
TEAM FORMATION

INVERTIS CSED SMART AUTONOMOUS EV – PRODUCT DEVELOPMENT

TEAM FORMATION

Sr. No	PRODUCT DEVELOPMENT STAGES	STUDENTS		STUDENTS	MENTORS
		BRANCH	CSED PREREQUISITE		
1	IOT APPLICATION DEVELOPMENT & SENSORS DEPLOYMENT	B. Tech (EE, ETC)	IT_1	5	**DCS** MR. NAZMUL **INVERTIS** Mr Kuldeep Verma, CSE Department
2	AUTONOMOUS SELF DRIVING SYSTEM INTEGRATION	B. Tech (Mech, CS)	Module 1 & 2	5	
3	DEVICE ENCLOSURE – DESIGN & MANUFACTURING	B. Tech (Mech)	Module 1 & 2	5	
4	AI MODEL DEVELOPMENT FOR SELF-DRIVING	B. Tech, BCA	IT_5 & IT_6	5	
5	APPLICATION DEVELOPMENT	B. Tech, BCA	IT_5	5	

1. IOT APPLICATION DEVELOPMENT & SENSORS DEPLOYMENT

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

2. AUTONOMOUS SELF DRIVING SYSTEM INTEGRATION

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

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3. DEVICE ENCLOSURE – DESIGN & MANUFACTURING

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

4. DEVICE ENCLOSURE – DESIGN & MANUFACTURING

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

5. APPLICATION DEVELOPMENT

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