



इलेक्ट्रॉनिक्स एवं  
सूचना प्रौद्योगिकी मंत्रालय  
MINISTRY OF  
ELECTRONICS AND  
INFORMATION TECHNOLOGY



ICEA  
INDIA CELLULAR  
& ELECTRONICS  
ASSOCIATION  
Inspire.Enable.Lead

# Grand Challenge Contest-2024

ON ELECTRONIC PRODUCT DESIGN & DEVELOPMENT

A joint initiative by Ministry of Electronics & Information Technology (MeitY), Govt. of India  
&  
Department of IT & Electronics, Govt. of Uttar Pradesh  
Partners: CDAC Noida and ICEA

Centre of Excellence (CoE) Noida, invites proposals  
for "Grand Challenge Contest -2024" on  
electronic product design and development

**Who can participate:**

Industry / College Students (Pursuing)



**Last Date for Team Registration:**

**HURRY UP** July 31, 2024 8PM

**Show Your Innovation & Win Exciting Prizes**

- Phase 1 : Design Phase
- Phase 2 : Prototype Development Phase
- Each phase is reviewed and evaluated by expert panel

**DON'T MISS THIS OPPORTUNITY  
TO SHOWCASE YOUR CREATIVITY AND  
INNOVATION!**

**Team Registration Link:**



<https://forms.gle/zwkAqFELxvHWTkAV6>



# Grand Challenge Contest-2024

ON ELECTRONIC PRODUCT DESIGN & DEVELOPMENT

## Problem Statements:

- P-001: To design a Headphone
- P-002: To design a Smartwatch
- P-003: To design an Access Control using RFID
- P-004: To design a UPS
- P-005: To design an Air Tag using GPS Navigation
- P-006: To design a Portable Power Tank with Solar Charging

## Important Dates:

Last date for team registration	31.07.24
Last date for synopsis submission	15.08.24
Date of synopsis approval	20.08.24
Last date for design submission	20.09.24
Declaration of Phase-1 winner	25.09.24
Declaration of teams for Phase-2 funding	30.09.24
Demo of product prototype	30.10.24
Declaration of Phase-2 winner	10.11.24

## Terms and Conditions:

- The contest is open for all Indian citizens.
- Each team can participate in two problem statements only
- The participating teams must register and submit their proposal for the design and development of the products
- After the acceptance of the synopsis, the team shall start with the designing of the products
- Two designs will be selected for further development of a prototype of the product
- A separate fund will be given to the selected teams for prototype development
- The best design and the best prototype shall be awarded a cash prize
- Team members need to submit an Intellectual Property Rights (IPR) declaration for designs submitted in the grand challenge
- If the team is from a college/university, a faculty member should be designated as the team leader

**For more details contact:**

coegc-noida@cdac.in



<https://forms.gle/zwkAqFELxvHWTkAV6>



# Grand Challenge Problem Statement

## 1. Headphone

### **Introduction:**

A pair of small speaker drivers that is worn on or around the head over the using wireless technology like Bluetooth or wire.

### **Feature required: -**

- Audio Connectivity: Bluetooth v5.0, /SD card/Aux
- Mic Connectivity: Yes
- Audio Frequency :20Hz to 20KHz

### **Challenges:**

- Product costs should be competitive as per the market trend.
- Should not have device pairing issue/poor connectivity issue.
- Audio Sound should be dynamic with Noise cancellation.
- Mic should work well at the time of calling.

## 2. Wearables (Smartwatch)

### **Introduction:**

Wearables products are those that are designed to be used while worn. These products often are close to or touch the human body which include different types of sensors. Targeted product in this category is Smartwatch.

### **Feature Required:**

- Attractive display
- Wireless connectivity
- Gesture Control
- Different call/notification alerts
- Different OS compatibility
- Fitness features
- Call receives and decline function
- Wired / wireless charging enabled

### **Challenges: -**

- Product cost should be competitive as per the market trend.
- There should be no device pairing/poor connectivity issue.
- There should be no lagging while using touch function.
- App should be compatible with different mobile OS.
- Smart watch should work without lagging.
- Unique design & different personalization and customization.
- Must follow IP67 /IP68 protection rating.

- Safety Security and Privacy should be maintained
- Compatibility with the third-Party app should be available

### **3. GPS Navigation system**

#### **Introduction:**

GPS trackers have become essential tools for monitoring the location of various objects, offering a range of connectivity options such as Bluetooth, Wi-Fi, and Cellular to ensure real-time tracking. These devices are incredibly versatile, capable of providing precise location data for personal items, vehicles, or even loved ones.

#### **Feature required:**

- Wireless connectivity Bluetooth/Wi-Fi/Cellular
- Application can be used as personal tracker
- Ability to find the real time location.

#### **Challenges:**

- Product costs should be competitive as per the market trend.
- No connectivity issue
- Accurate real-time positioning
- Built in memory to store logs

### **4. UPS**

#### **Introduction: -**

UPS system is an uninterruptible power supply which is used to provide continuity of power in the event of power grid interruption in the supply. In this category, a single phase to single phase output for household use is recommended.

#### **Featured requirement: -**

- Auto over-load handling capacity
- Comprehensive protection against short-circuits, reverse polarity, battery over-charge, deep discharge etc.
- Protection from Input mains
- Bypass switch for supplying output directly from grid in case of Home UPS fault.
- Noiseless Operations with the help of low harmonic distortion
- Intuitive Display to easily understand status of mains availability, battery status, etc.
- Output Wattage 360W
- Output Voltage: 230V AC, 50Hz

#### **Challenges: -**

- Product cost should be competitive as per the market trend.
- Product should be safe for sensitive appliances with sine wave output.
- Design should be compact in size for the high wattage design.
- Wide input power regulation
- High efficiency <80% power backup,

- Thermal management to be incorporated

## **5. RFID Access Control**

### **Introduction: -**

Radio Frequency Identification (RFID) is a technology that uses electromagnetic fields to automatically identify, and track tags attached to objects. The tags contain electronically stored information, which can be read from a distance using an RFID reader.

### **Featured requirement: -**

- Memory Capacity: Sufficient storage for unique identifiers and additional data (if required).
- Connectivity: Support for various communication protocols (TCP/IP, Wi-Fi, Bluetooth, RS232/RS485).
- Compatibility: Ability to work with different types of RFID tags (ISO standards compliance).
- Power Supply: 12V DC
- Design: Antenna design that matches the read range and environmental conditions (indoor/outdoor).
- Orientation and Placement: Flexible installation options to ensure optimal performance.
- Remote Management: Remote configuration and management capabilities for the system.
- Backup and Recovery: Regular data backup and easy recovery options.

### **Challenges:**

- Product costs should be competitive as per the market trend.
- Product should be safe for sensitive appliances with sine wave output.
- Data Security: Ensuring that data transmitted between RFID tags, readers, and backend systems is encrypted and secure from interception or tampering.
- Authentication: Preventing unauthorized access by implementing strong authentication mechanisms.

## **6. Portable Power Tank with Solar Charging**

### **Introduction:**

A portable power station is a versatile and compact device designed to provide electrical power in situations where conventional power sources are unavailable or impractical. These devices are essential for outdoor activities, emergency situations, and remote work. They are essentially large batteries with multiple output options, capable of powering various electronic devices and small appliances.

### **Featured requirement: -**

- Lithium-Ion: Common for its high energy density and lightweight.
- Lithium Iron Phosphate (LiFePO<sub>4</sub>): Known for its safety, stability, and long cycle life.

- AC Output: The number and type of AC outlets, with output power in watts (200W).
- DC Output: Number of DC ports and their power ratings (e.g., 12V/10A). (12v/5A)
- USB Output: Number and types of USB ports (e.g., USB-A, USB-C) and their power ratings (e.g., 5V/2.4A, PD 60W). (only USB-A 5V/2.4A 2 ports. USB-C PD complex)
- Peak Power: The maximum power the device can supply for a short period, important for starting devices with high inrush currents.
- AC Charging: Product can be charged from 220V AC /50Hz.
- DC Charging: Product can be charge from external 16V/5A DC source
- Solar Charging: Input voltage and power rating for solar panels, often with an integrated MPPT (Maximum Power Point Tracking) controller for efficiency.
- Type: Pure sine wave or modified sine wave.
- Efficiency: Conversion efficiency, typically around 85-95% for pure sine wave inverters.
- Compact designs & light weight for portability
- The temperature range for safe operation, typically from -10°C to 40°C (14°F to 104°F).
- The number of charge and discharge cycles the battery can undergo before its capacity drops below a certain level, usually specified for lithium-based batteries (e.g., 500-2000 cycles).

**Challenges: -**

- Product cost should be competitive as per the market trend.
- Product should be safe for sensitive appliances with sine wave output.
- Design should be compact in the size for the high wattage design.
- Wide input power regulation
- High efficiency <80% power backup,
- Thermal management is recommended.