

# HARD & SOFT 2026 SUCEAVA

17.05.2026 – 24.05.2026

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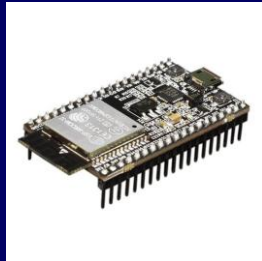
Cognizant Mobility Romania

## Smart Fall Detection & Vital Monitoring Device for Elderly Care

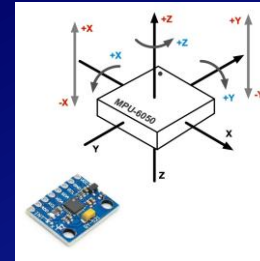
- Design and build a reliable embedded healthcare system capable of monitoring vital signs and detecting accidental falls in real time.
- The system must operate autonomously, process data locally (edge computing), and react reliably under uncertain real-world conditions.
- Participants are encouraged to combine embedded systems, intelligent decision-making, robustness engineering and security-aware design principles into a coherent standalone device.

# WHAT YOU GET

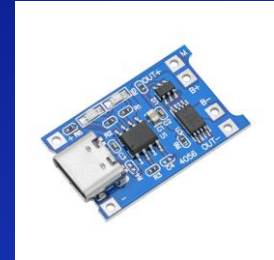
ESP32-DevKitC



Accelerometer +  
Gyroscope Module



Battery & Charging  
Module



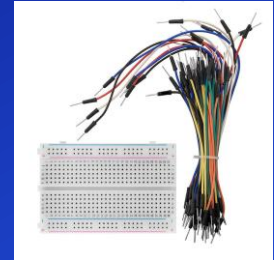
HR & SpO<sub>2</sub> Sensor



OLED Display



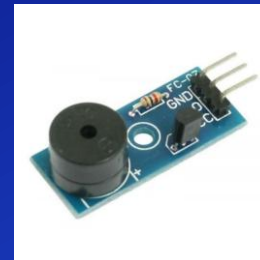
Breadboard Kit



Temperature Sensor



Buzzer & LEDs



Access to 3D printing facilities for  
enclosure prototyping

# WHAT YOU HAVE TO DO

## Key Objectives

- Monitor HR, SpO<sub>2</sub> and body temperature in real time
- Detect accidental falls using sensor fusion techniques
- Generate local alarms and event notifications
- Operate autonomously on battery power
- Minimize false alarms during normal activities
- Demonstrate reliable real-time behavior

## Highlights

- Challenges your ability to build reliable embedded systems
- Encourages intelligent edge processing and explainable logic
- Security and robustness are considered part of the engineering solution
- Unknown live validation scenarios may be introduced during final demonstrations

# THE JURY EXPECTS YOU TO

- ✓ Make purposeful, functional and technically justified design choices
- ✓ Use all essential hardware components provided in the kit and demonstrate coherent hardware–software integration.
- ✓ Build a truly autonomous system capable of operating without external cloud dependency.
- ✓ Pay attention to
  - Robustness
  - Reliability
  - Security
  - Power management
  - False-positive reduction
- ✓ Participants are encouraged to use AI tools responsibly, while maintaining full understanding of the implemented solution.

# EVALUATION CRITERIA

## Deliverables & Milestones

- Design Document: Submit a brief design PDF by Tuesday, 10:00 AM via email to the Jury.
- Jury Lab Visit: On Wednesday, the Jury will visit the lab for approximately 15 minutes to review work-in-progress.
- Final Report: Submit a final summary PDF by Friday, 8:00 AM via email to the Jury.
- Public Demonstration: On Friday morning, live final demonstration and technical evaluation

## Evaluation Criteria

- Core functionality and reliability
- Fall detection performance
- Intelligent edge processing, security & robustness
- Hardware–software integration
- User experience and usability, technical presentation and documentation

# JURY



## President:

**Vlad VOICULESCU – Cognizant-Mobility GmbH, Munich**

## Members:

**Peter SCHARFF – Technische Universität Ilmenau**

**Oliver FAUST – Ruskin University, Cambridge**

**Sorin BORA – Cognizant Mobility Romania, Timisoara**

**Alexandru IOVANOVICI – Universitatea Politehnica Timisoara**



**THANK YOU**

**HARD & SOFT SUCEAVA 2026**

**“Technology that reacts when it matters most.”**