
# SUMMER PRACTICE

Build the future that moves the world.

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**16 March**

Launching Summer Practice projects

**23-27 March**

Open Applications

**30 March - 03 April**

Validation & Project Allocation

**06 April - 15 May**

Technical & HR discussions

**18 May- 26 June**

Final results & Contract Signing

**6 July - 11 September**

Summer Practice 2026

AUMOVIO

# HARDWARE ENGINEERING

## SENSOR TESTER FOR INDUCTIVE POSITION SENSORS (IMOPS)

### Project Description

The project aims to design and develop a standalone tester device for inductive position sensors with analog SIN/COS outputs.
The tester will mechanically drive a target wheel using a stepper motor and will read the sensor's analog outputs using a microcontroller platform (Arduino or ESP32). Based on the acquired SIN/COS signals, the system will compute the angular position of the shaft in real time.

The project involves both hardware and software development activities, including electronic interfacing, embedded programming, signal processing, mechanical design, and 3D printing. The final device will display calculated angle values and relevant signal characteristics (such as sine and cosine peak-peak amplitudes, min and max amplitudes, offset etc) on a display, acting as a functional diagnostic tool for inductive position sensors.

### Main Responsabilities

Design the system architecture of a sensor tester device
Interface analog SIN/COS sensor outputs with a microcontroller.
Implement angle calculation algorithms based on SIN/COS signals
Control a stepper motor to rotate the target wheel in a controlled manner
3D print and assemble the mechanical parts
Test, validate, and document the functionality of the device

### MUST HAVE

Basic electronics (voltage levels, analog signals, sensors)
Fundamentals of embedded systems and microcontrollers
Basic Programming skills in C/C++ (Arduino-style environment)
Basic mathematics and trigonometry (angle calculation from SIN/COS)

### NICE TO HAVE

Experience with Arduino or ESP32 platforms
Basic motor control (stepper motors, drivers)
Signal processing concepts (filtering, noise handling)
Familiarity with 3D printing technologies
Basic understanding of sensors

## ROBOTIC ARM CONTROL TO SIMULATE A TURNTABLE FOR AN IMU SENSOR

### Project Description

This project aims to design and develop an air volume simulator used in Wet HIL testing of an Electrohydraulic Brake Control Unit (HECU).
The air volume simulator should allow air volume adjustment required during Wet HIL testing, with a resolution of app. 1 ccm, without active pressure control and supporting safe and repeatable testing.

### Main Responsabilities

-Understand the Wet HIL setup and the role of air volume simulation for HECU
-Design a simple mechanical/pneumatic solution for precise air volume adjustment
-Support assembly and integration of the air simulator on the test bench or HIL
-Perform functional tests on the HECU
-Document the solution and test results

### MUST HAVE

-Hydraulics basics
-3D Design basics
-Mechanics basics
-Electronics basics

### NICE TO HAVE

Strong desire to learn new things

# HARDWARE ENGINEERING

## ATTACHABLE TRAILER PARKING ASSISTANT

### Project Description
An autonomous sensor parking system integrated into a portable box that can magnetically attach to the back of the trailer (or camper). Because this autonomous box has its own power source, it functions independently of the electrical system of the vehicle. This portable system can be attached to any trailer, camper or van which doesn't have built-in parking sensors, automatically transforming the experience of the driver by adding control, safety and comfort.

### Main Responsabilities
The student would require (but would not be limited to) knowledge of: Schematic design in Altium, DipTrace, Eagle or similar tool. Schematic simulation in Pspice, LtSpice, etc. Worst case analysis calculus. Working with microcontrollers and writing embedded C++ code. Creating a presentation and documenting the project. The complexity of the project can be adapted to the abilities and work speed of the student by allowing for: Breadboard execution of a working prototype, 3D mechanical design of the case, 3D printing of the prototype, Layout design and execution of the actual PCB, Mobile app for driver control and notification.

### MUST HAVE
Altium designer (or similar tools), OrCAD, LtSpice, Arduino IDE programming.

### NICE TO HAVE
Knowledge of 3D printing and ability to work on personal hobby electronic projects.

## LED DRIVER CONTROL & CALIBRATION TOOL USING EXCEL, ARDUINO, AND I²C

### Project Description
The purpose of this project is to create a control and calibration tool that allows LED-driver register configuration and integrates a current-measurement function to validate the impact of register settings on the output current. The solution will use an Excel interface to send commands to an Arduino, which communicates with the LED driver via I²C. The tool will support setting target output currents for a constant-current buck converter and reading back the measured current to compare against requested values across multiple ranges.
The project combines digital communication, power electronics, and measurement systems, offering hands-on experience with LED drivers, buck/boost converters, and practical current measurement/control techniques.

### Main Responsabilities
Develop Excel macros/scripts to send LED-driver register commands via Arduino.
Implement Arduino firmware for I²C communication with the LED driver.
Integrate and control the constant-current buck converter.
Integrate a current-sensor module (ex. shunt) and acquire measurements through the Arduino ADC.
Implement an automation feature
Create Excel functions that display requested vs. measured current, deviations, and calibration trends.
Perform characterization tests to evaluate how register changes affect current across all operating ranges.
Document the workflow, calibration logic, automation sequence, and measurement results.

### MUST HAVE
Basic understanding of buck and boost converter operation
Operation of constant-current buck converters
Power stages, switching behavior, inductors, MOSFETs, and feedback loops
I²C communication protocol (master/slave, addressing, write/read sequences)
Arduino programming
Analog-to-digital conversion (ADC)
Excel VBA or scripting to automate register control sequences
Data logging, validation, and visualization in Excel
Serial communication

### NICE TO HAVE
Previous experience with power electronics lab equipment (DC power supply, multimeter, oscilloscope)
Familiarity with shunt amplifiers (e.g., INA219, INA226)
Knowledge of debugging tools (logic analyzer, serial monitor)
Familiarity with constant-current regulation theory

## FUNDATION BRAKING PRESENTATION BENCH

### Project Description
In order for a better understanding of the evolution of braking system we want to create a presentation bench for present a near future foundation braking systems, like: HPB Caliper, EPB Caliper, eCaliper, ICE Drum-Brake and EPB Drum-Brake.
The foundation system from the bench will be sectioned for a better understanding of how the systems work and also converting them to be actioned manually.

### Main Responsabilities
-Finding the most optimized solution for section cut;
-Thinking of the section cutting with the condition of the product to work properly;
-Modify the Products in order to be easy actioned by hand.
-Building a Stand for presenting all the Products;
-For all of the above responsibilities the student has to prepare 3D models, 2D drawings, Tolerance calculation, BOMs and to assemble the final bench.

### MUST HAVE
3D modeling
Technical drawing rules
GD&T
Mechanical Dynamics
Types of assemblies

### NICE TO HAVE
- Good understanding of how braking systems work;
- Practical mindset;

# HARDWARE ENGINEERING

## Embedded brushed/ brushless MOTOR controller

### Main Responsabilities

- Basic electronics knowledge: Understanding of passive components (resistors, capacitors, inductors) and their basic behavior in circuits.
- Basic microcontroller knowledge: Familiarity with microcontroller concepts (e.g., how to interface with microcontrollers and usage of peripherals).
- Basic understanding of DC-DC converters: Understanding the fundamental principles of voltage conversion (buck, boost, or buck-boost converters) and their applications in embedded electronics.
- Basic PCB knowledge: Familiarity with the basic concepts of PCB design (e.g., components placement, routing)

### NICE TO HAVE

- Basic electronics knowledge: Understanding of passive components (resistors, capacitors, inductors) and their basic behavior in circuits.
- Basic microcontroller knowledge: Familiarity with microcontroller concepts (e.g., how to interface with microcontrollers and usage of peripherals).
- Basic understanding of DC-DC converters: Understanding the fundamental principles of voltage conversion (buck, boost, or buck-boost converters) and their applications in embedded electronics.
- Basic PCB knowledge: Familiarity with the basic concepts of PCB design (e.g., components placement, routing)

### Project Description

The goal of this project is to design the hardware for a sensorless Brushless DC (BLDC) motor controller using the Back Electromotive Force (BEMF) method for sensorless operation.
The controller will be responsible for efficiently driving a BLDC motor without the need for physical position sensors, using the motor's back EMF to determine the rotor position.
The student will work through the full hardware design process, from initial concept to schematic and PCB layout, while gaining hands-on experience with motor control, power electronics, and PCB design.
Main Responsabilities
Design the system architecture of a sensor tester device
Interface analog SIN/COS sensor outputs with a microcontroller.
Implement angle calculation algorithms based on SIN/COS signals
Control a stepper motor to rotate the target wheel in a controlled manner
3D print and assemble the mechanical parts
Test, validate, and document the functionality of the device

### MUST HAVE

Basic electronics (voltage levels, analog signals, sensors)
Fundamentals of e

# SOFTWARE DEVELOPMENT

## 4 CORNER AIR SUSPENSION

### Project Description
Creating an air suspension system using 4 dampers.

### Main Responsabilities
-Project documentation
-Setup design
-Create the application code
-Testing the functionality

### MUST HAVE
C Embedded
HW knowledge

### NICE TO HAVE

## AUTOMATIC INSTALLER FOR TEST BENCH SETUP

### Project Description
Tool which is helping with installing and maintaining the Test Benches up-to-date. Focus is for Software setup: tools, configurations, scripts, etc.

### Main Responsabilities
Implement a solution in Python using any other technologies you can propose that are helpful. (e.g. Docker, Jenkins, Ansible, etc.)

### MUST HAVE
Python and OOP.

### NICE TO HAVE
Docker, Jenkins, Ansible

## *AI GENERATED WORST CASE CIRCUIT ANALYSIS TOOL*

### Project Description
Use AI tools to generate an Windows app for running Worst Case Circuit Analysis quick and easy.

### Main Responsabilities
Together with mentor, define the set of function the future app must perform.
Build and tweak the app.
Create the app user manual.

### MUST HAVE
SOFTWARE:
Basic programming skills.
HARDWARE:
Basic understanding of the electrical components specifications (datasheets specs).

### NICE TO HAVE
Experience on solving technical problems (e.g. generating apps) with AI tools.
Experience with developing personal technical projects (either software of hardware).

## ADVANCED VOLKSWAGEN DIAGNOSTIC TOOL (AVD)

### Project Description
The scope of the project is to design and develop an advanced diagnostic tool for Volkswagen projects in order to have a friendly interface for each Volkswagen project involved. This project will be created for saving time to automate diagnostic process in Volkswagen projects. An AI assistant will be attached to get more precise the information by using RAG use case for UDS and VW UDS.

### Main Responsabilities
- Give a rapid and explained root cause after sending the request to the ECU.
- Make the diagnose working easier for the user.
- Unlock SFD (Schutz der Fahrzeugdiagnose) or PVD (Protection of Vehicle Diagnostics) based on roles and duration.
- Friendly usage of non-PVD or non-E2E Vehicle Diagnostics

### MUST HAVE
Programming in C# and automation skills.

### NICE TO HAVE
Drive to develop automated methods; working with AI tools; curiosity.

## VEHICLE DYNAMICS SIMULATION

### Project Description
You will model the dynamics of a car.
When the wheels of the car are turned at an angle X, how fast does the car turn, how tight is the turn, and other similar behaviours.
This will include a user interface where you can move the car (e.g. with the arrow keys).
If time allows you will also model obstacles and collisions.
The project can be done in either Python or C++.

### Main Responsabilities
You will learn a graphics library to render the simulation.
You will learn the (simplified) math behind how a car turns and drives.
You will implement the main project and extend it as time allows.
You will track development via Git and GitHub.

### MUST HAVE
- Good algorithms and data structures knowledge
- Good reasoning skills and analytical thinking
- Basic trigonometry and algebra (2-dimensional vectors)

### NICE TO HAVE
- Git / Github
- Basic experience in a graphical or game library (pygame, raylib, SDL etc)

# SOFTWARE DEVELOPMENT

## SENSOR FUSION FOR OBJECT RECOGNITION (OLD: ACTIVE SENSOR FUSION SE FACE MERGE CU OBJECT RECOGNITION SYSTEM)

### Project Description
The project scope is to develop a system for detecting and tracking objects. The system will be built using
a Raspberry Pi platform and it involves acquiring data from two or more sensors like LiDAR or camera(s).
The collected data will be fused to detect objects kinematics.

### Main Responsabilities
- Interface the main processing unit with the sensors to ensure proper data acquisition
- Develop algorithms for distance measurement and obstacle mapping using the data acquired by
the LiDAR sensor
- Get acquainted with ML (Machine Learning) & CV(Computer Vision) topics
- Develop a technique to fuse the collected data

### MUST HAVE
3D modeling
Technical drawing rules
GD&T
Mechanical Dynamics
Types of assemblies

### NICE TO HAVE
- Good understanding of how braking systems work;
- Practical mindset;

## APPLICATION FOR PRODUCTION REPORT ANALYSIS USING LLMS AND RAG

### Project Description
You will build a browser accessible web console(Controller) and a lightweight Agent running on Linux servers.
The Controller displays near real time system metrics(CPU, memory, disk usage etc) for all connected hosts and enables a terminal which can run commands on multiple hosts simultaneously

### Main Responsabilities
With support from mentor, you shall:
-Understand how components in a controller-agent architecture interact
-Learn & build a minimal web backend and expose simple APIs
-Learn how to collect Linux system metrics with a lightweight agent
-Apply security basics in a practical project
-Define a list of improvements and implement them

### MUST HAVE
Python
Linux command line
Git
Basic networking/TLS concepts

### NICE TO HAVE
HTML/CSS/JavaScript
gRPC
Basic networking/TLS concepts
xterm.js

## AI INFRASTRUCTURE SUPPORTING V-CYCLE DEVELOPMENT

### Project Description
This summer practice project focuses on designing and implementing an AI-enabled infrastructure to support the V-Cycle development process used in system and software engineering. The project explores how artificial intelligence can enhance different phases of the V-Cycle, such as requirements analysis, design validation, testing, and verification.
The intern will work on defining an AI-based framework that assists engineers by automating repetitive tasks, improving traceability between development stages, and providing intelligent insights from development and testing data. The project combines concepts from AI, software architecture, DevOps, and systems engineering, offering hands-on experience with real-world engineering workflows.
By the end of the project, the intern will have a solid understanding of how AI tools and infrastructure can be integrated into structured development lifecycles to improve efficiency, quality, and reliability.

### Main Responsabilities
Analyze the V-Cycle development model and identify stages where AI support can add value
Design a high-level AI infrastructure architecture supporting V-Cycle activities
Research and evaluate AI techniques applicable to requirements analysis, validation, testing, or defect detection
Implement proof-of-concept tools or scripts demonstrating AI integration in selected V-Cycle phases
Work with development and testing data to train or evaluate simple AI/ML models
Document the proposed infrastructure, design decisions, and experimental results
Present findings and recommendations at the end of the summer practice

### MUST HAVE
- Good algorithms and data structures knowledge
- Good reasoning skills and analytical thinking
-Knowledge of Matlab programing language, Simulink and Stateflow

### NICE TO HAVE
-Testing knowledge
-Requirements Engineering knowledge

## LIGHT ANIMATION INTERFACE FOR PARAMETRIZATION

### Project Description
The purpose of this project is to update and maintain an user interface for light animations configuration. The GUI is implemented in phyton and uses as input/output the parameters files used for Light Control ECUs configuration. The tool is intended to ease the configuration and provide a visual display of the light animation configured done.

### Main Responsabilities
Understand the current status of the application and be able to make updates.
Develop new features for the existing tool based on stakeholders change requests.
Perform updates on the user manuals and workflows.

### MUST HAVE
Phyton
Scripting

### NICE TO HAVE
C++
Java
C#

# SOFTWARE DEVELOPMENT

## CYBERSECURITY TOOL FOR ANALYZING SECURE HARDWARE EXTENSION I/O

### Project Description
The project aims to design and develop a Cybersecurity Analysis Tool dedicated to decoding, parsing, and assessing I/O (input/output) messages between Application and Secure Hardware Extension; between tester tool and ECU.

### Main Responsabilities
Understand and handle cryptographic operations.
Compute input messages for the Secure Hardware Extension, ECU.
Parse and verify output messages from the Secure Hardware Extension, ECU.
Compute and display analysis results.
Perform testing on the tool.
Collaborate in an Agile-style environment, integrating mentor and user feedback.
Create documentation and explain tool functionality.

### MUST HAVE
Embedded C Programming
Proficiency with IDEs (Integrated Development Environments)
Cryptography Fundamentals (Symmetric/ Asymmetric encryption, AES, CMAC).

### NICE TO HAVE
Scripting & Automation: Python (including GUI development) or Excel/VBA.
SHE / HSM Knowledge

## AUTOMOTIVE PLATFORM BUILD SYSTEM

### Project Description
You will work on improving the build system of a SW Platform that serves multiple projects. You will have the chance to learn how an entire vehicle sub-system is created (e.g. the Infotainment system)

### Main Responsabilities
With support from mentor, you shall:
-Learn how to build a Linux Distro using Yocto
-Learn how we use Yocto in our team
-Learn the architecture of our projects
-Learn how to work with HW boards used in vehicles
-Define a list of improvements and implement them

### MUST HAVE
Linux command line
Bash
Python
C/C++
Git

### NICE TO HAVE
CMake

## SMART PLUG-AND-CHARGE ENVIRONMENT BUILDER

### Project Description
The goal of this project is to design and develop a fully automated setup that enables seamless Plug and Charge (PnC) communication within an integrated development environment. Plug and Charge is a core mechanism used by the vehicle's charging protocol to authenticate the car and authorize energy delivery automatically, allowing the vehicle to start charging and also payment without manual user intervention.
Plug and Charge functionality relies on multiple interconnected components, including network services, communication stacks, and system-level configuration modules that must operate cohesively between the High-Performance-Computer (HPC) and the computer hosting the simulated services. The project focuses on building automation tools, configuration logic, and supporting software components that ensure all these elements, including certificate handling, security initialization, and communication workflows, are correctly set up, aligned, and ready for reliable PnC communication.

### Main Responsabilities
1. Requirements & Architecture
Analyze the Plug and Charge environment and identify needed configuration and communication steps.
Define a clear automation architecture based on the current manual workflow.
2. Automation Development (Python & C++)
Implement modules for managing ports, PKI certificates, and service endpoints. 3. Automated Configuration Framework
Develop a framework to generate, validate, and deploy configuration files to the Head Unit and the development machine.
4. Integration with Simulated Services
Implement automated port and service configuration to support the interaction with simulated charging components.
5. Validation & Documentation
Validate the functionality of the developed automation components.
Provide concise technical documentation for setup and future development.

### MUST HAVE
C++
Python
Git / GitHub

### NICE TO HAVE
CMake

# SOFTWARE DEVELOPMENT

## APPLICATION FOR AUTOMATED PCB DESIGN PARAMETERIZATION AND RULE GENERATION

### Project Description

The goal of this project is to develop an application that automatically generates and parametrizes PCB design rules based on manufacturing limitations, fabrication technology constraints, and process-specific guidelines.
The system will analyze PCB manufacturer specifications (e.g., minimum trace width, spacing, via dimensions, stack-up details) and produce validated, consistent rule sets that can be imported into or referenced by PCB design environments.
The student will complete all stages of the software development process—from concept and architecture to implementation, GUI creation, and testing—gaining practical experience in PCB manufacturing rules, engineering data extraction, and C# application development.

### MUST HAVE

- Basic PCB design knowledge: understanding of clearances, trace widths, vias, drill sizes, copper layers, and other fundamental constraints.
- Basic understanding of PCB manufacturing technologies: awareness of minimum feature sizes, fabrication tolerances, and stack-up rules.
- C# programming skills: ability to write structured application logic and work with classes, serialization, and data handling.
- Basic data processing ability: ability to clean, format, and structure raw manufacturing specifications from documents and tables.
- GUI development knowledge in C#: familiarity with WPF, WinForms, or .NET MAUI.

### Main Responsabilities

The student will be responsible for researching PCB fabrication constraints, designing the application architecture, and implementing the automated rule-generation functionality. The main tasks include:
- Researching PCB manufacturing limitations, standard and advanced (HDI, fine-pitch, flex, etc.) fabrication technologies.
- Designing the system architecture for rule extraction, validation, and parameter generation.
- Implementing a data ingestion pipeline to read manufacturing specifications and clean, structure, and standardize the raw input data (PDF text, CSVs, tables, technical documents).
- Developing logic and algorithms for:
  - Extracting PCB design constraints from structured and unstructured documents
  - Translating manufacturing limitations into design rule parameters (trace/space, via sizes, annular rings, drill tolerances, copper weights, stack-ups)
  - Automatically generating complete PCB rule sets for different technologies
  - Detecting inconsistent or incompatible rule combinations
- Developing a mandatory graphical user interface (GUI) in C# that allows users to:
  - Select PCB technology profiles
  - Input or upload manufacturing specifications
  - Visualize generated rules
  - Export the rule parameters
- Implementing the backend logic and data models in C# using clean and modular architecture principles.
- Exporting the generated rule sets in structured formats (JSON, XML, CSV) compatible with common EDA environments.
- Testing the application across multiple manufacturing profiles to ensure reliability and correctness.

### NICE TO HAVE

- Experience interpreting technical datasheets or engineering specifications
- Familiarity with JSON/XML formats
- Experience with Git/version control

## BUILDING AI TEAMMATES FOR DEVELOPERS AND TESTERS

### Project Description

Project aims to design and implement a set of AI-powered agents to support software development and testing activities.
The students will explore how Large Language Models (LLMs) and AI workflows can be integrated into real engineering processes such as:
Log processing and anomaly detection
Ticket clustering and defect analysis
Automated test review and improvement suggestions
Requirement consistency and completeness checks
The goal is to build practical AI assistants (agents) that can analyze structured and unstructured data (logs, tickets, test cases, requirements) and provide actionable insights to development and QA teams.
The project will combine software engineering fundamentals with applied AI, focusing on real-world use cases from ongoing projects.

### Main Responsabilities

Analyze existing engineering artifacts (logs, tickets, test cases, requirements)
Define use cases where AI agents can bring measurable value
Design and implement AI agents using LLM APIs or open-source models
Develop pipelines for:
Log parsing and summarization
Ticket categorization and root cause hints
Test case review (coverage gaps, redundancy detection)
Requirement clarity and ambiguity detection
Create evaluation metrics to assess agent performance (accuracy, usefulness, time saved)
Document architecture and usage guidelines
Present final prototype and results to stakeholders

### MUST HAVE

Basic knowledge of Python
Understanding of software development lifecycle (SDLC)
Familiarity with Git
Basic understanding of APIs
Analytical thinking and structured problem solving
Basic understanding of testing concepts (test cases, defects, requirements)

### NICE TO HAVE

Experience with AI/ML or LLMs
Experience using tools like ChatGPT, Copilot, or similar
Knowledge of prompt engineering
Experience with log analysis tools
Basic understanding of NLP concepts
Familiarity with Docker
Experience working in Agile environments

# SOFTWARE DEVELOPMENT

## REACT BASED HMI FOR CCAM

### Project Description

The HMI concept is based on an in-vehicle tablet, designed to display the Digital Twin for a Collective, Collaborative Autonomous Mobility (CCAM) System, provide collective awareness, prediction and autonomous decisional information transparently, as well as to collect input from the vehicle user.
The HMI will interface with the vehicle through a Robot Operating System (ROS) WebSocket bridge, will integrate advanced Foxglove / LichtBlick visualization panels and dedicated REACT components for user interaction.
On the ROS side a dedicated node will collect and aggregate messages from perception, prediction and decision-making functions, transmitting them to the HMI. Vehicle – user interaction messages will also be defined at this level.

### Main Responsabilities

Guided by mentor, extend the HMI architecture and implement the mockup design/requirements until a proof of concept is reached. Implementation will be delivered incrementally:
- Integration of data visualization panels into REACT – tested with open-source recordings sent from Foxglove/ LichtBlick.
- Integration of WebSocket Bridge – tested with recorded data sent from ROS environment.
- Implementation of ROS messages for CCAM specific use-cases, to inform, warn and interact with the vehicle user – messages will be sent to the HMI.
- Implementation of REACT components for displaying warnings, information and collecting user input.

### MUST HAVE

JavaScript, python, C – experimented
REACT – experimented
Linux – basic
ROS2 – basic

### NICE TO HAVE

Foxglove/ LichtBlick – would be a plus

## Linux Systems Monitoring and Control Platform

### Project Description

You will build a browser accessible web console(Controller) and a lightweight Agent running on Linux servers.
The Controller displays near real time system metrics(CPU, memory, disk usage etc) for all connected hosts and enables a terminal which can run commands on multiple hosts simultaneously.

### Main Responsabilities

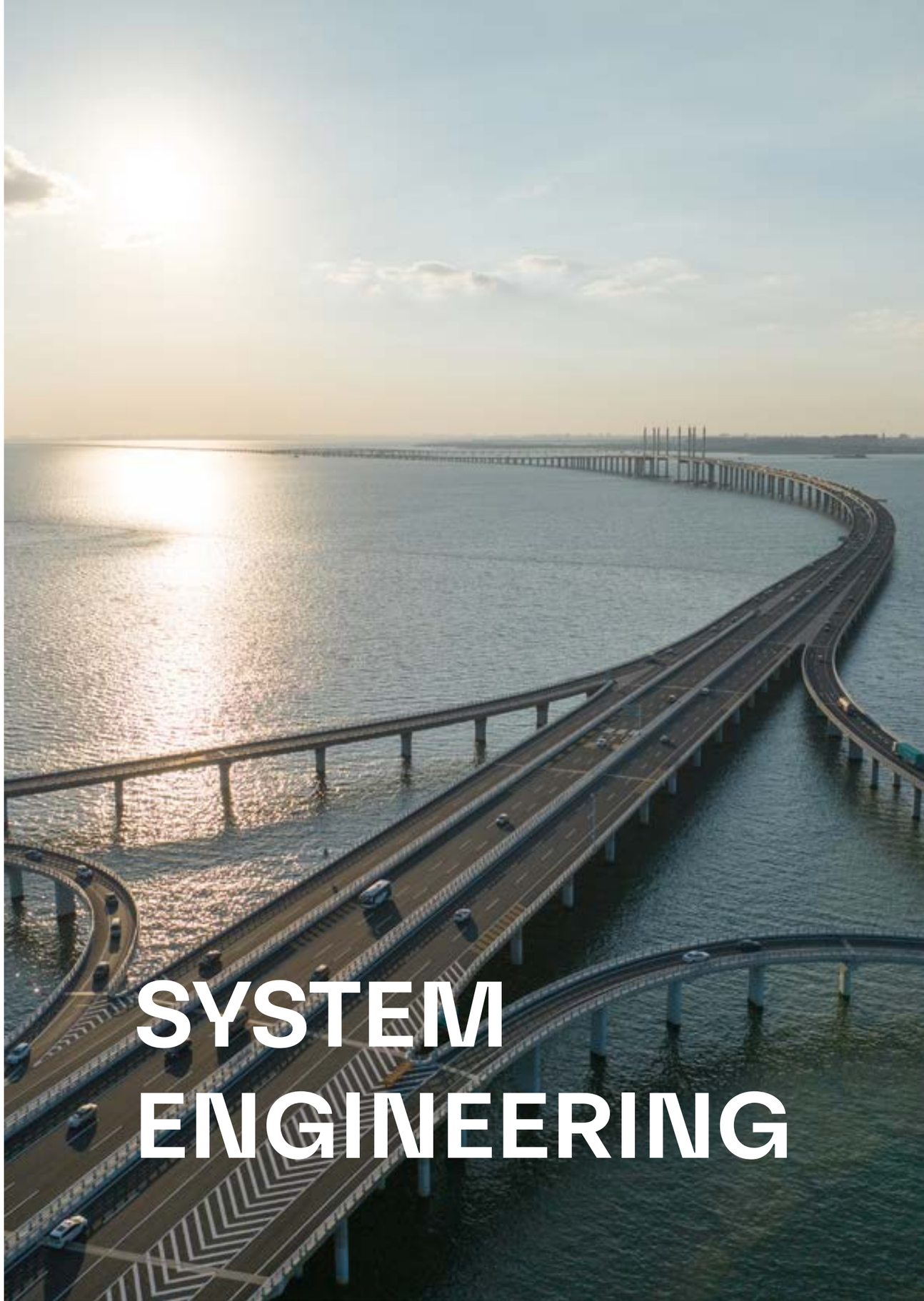
With support from mentor, you shall:
-Understand how components in a controller-agent architecture interact
-Learn & build a minimal web backend and expose simple APIs
-Learn how to collect Linux system metrics with a lightweight agent
-Apply security basics in a practical project
-Define a list of improvements and implement them

### MUST HAVE

Python
Linux command line
Git
Basic networking/TLS concepts

### NICE TO HAVE

HTML/CSS/JavaScript
gRPC
Basic networking/TLS concepts
xterm.js



# SYSTEM ENGINEERING

# SYSTEM ENGINEERING

## IBM RHAPSODY GUI INTEGRATION FOR STREAMLINED ARCHITECTURAL MODELING VALIDATION

### Project Description
Develop a GUI in IBM Rhapsody which verifies that the architectural modeling rules are applied properly. The output of the GUI shall be an analysis report containing all found inconsistencies.

### Main Responsabilities
Guided by the mentor, design and build the HW and SW architecture for HiL hardware component identification, configuration memory and change-detection mechanism. Define data models, traceability rules and integrity checks to detect any hardware changes.
Integrate the solution with the central HiL monitoring platform. Coordinate with hardware and software teams to ensure scalable, secure and compliant deployment across full HiL test infrastructure.

### MUST HAVE
Basic understanding of electronics, including voltage levels, analog and digital signals, and common sensors.
Introductory knowledge of embedded systems and microcontrollers.
Basic programming skills in C/C++, preferably in an Arduino-style or similar embedded environment.

### NICE TO HAVE
Interest in hardware systems, learning embedded platforms, and working with real test equipment

## LORA SENSOR NETWORK

### Project Description
The projects aims at implementing a sensors network. The net includes the sensors themselves and a central unit. Communication relies on LoRa. To put this in practice, the project will be built for a real-time parking lot vacancy map.

### Main Responsabilities
- Define the HW&SW architecture.
- Integrate SW&HW components.
- Define HW&SW tests to validate the well functioning of the products.

### MUST HAVE
Basic Electronics.
- To be able to read and make schematics.
- To be able to measure signals.
Microcontroller Fundamentals.
- To know how a microcontroller works.
- To know what's roughly inside a microcontroller.
Writing C code for embedded.
- To be able to write basic C code (nothing fancy).
- To be able to use at the very least open source libraries ( e.g. like the ones provided by Adafruit).
Basic knowledge about signals.
- To be familiar with frequency, bandwidth, power.

### NICE TO HAVE
- Any of the languages : python, go and the ability/knowledge to make a basic server.
- Any of the languages: python, R for data analysis and data visualization (heavily depends on how quick the basis of the project can be implemented).
- Basic knowledge about Linux based OS (installing a package, navigating through the command line).
- Networking (e.g. TCP/IP, packets, OSI layers).

## HIL TRACEABILITY & CONFIGURATION ENFORCEMENT (TRACE)

### Project Description
The project aims to design, develop and integrate a hardware monitoring platform for all components used in HiL testing platforms.
This implementation is aimed to provide a full hardware traceability for the components under test, guarantying a full reproducibility if required, a trigger point for engineering reviews and the possibility to generate Audit reports for architecture and configuration used for testing.

### Main Responsabilities
Guided by the mentor, design and build the HW and SW architecture for HiL hardware component identification, configuration memory and change-detection mechanism. Define data models, traceability rules and integrity checks to detect any hardware changes.
Integrate the solution with the central HiL monitoring platform. Coordinate with hardware and software teams to ensure scalable, secure and compliant deployment across full HiL test infrastructure.

### MUST HAVE
Basic understanding of electronics, including voltage levels, analog and digital signals, and common sensors.
Introductory knowledge of embedded systems and microcontrollers.
Basic programming skills in C/C++, preferably in an Arduino-style or similar embedded environment.

### NICE TO HAVE
Interest in hardware systems, learning embedded platforms, and working with real test equipment

## CAN TOOLS USED IN AUTOMATION

### Project Description
CANoe is a tool used widely in automotive industry that enables simulation of communication protocols (CAN/ LIN etc). The scope of the project is to develop small modules in CAPL/CVI with GUI that will facilitate easier prototyping and validation of CAN messages.

### Main Responsabilities
- Learn about CAN communication Bus
- Learn CAPL - C based programming
- Learn TestStand - Sequencer used in automation
- Implement function, add documentation
- Validate the implemented modules

### MUST HAVE
- C Programming

### NICE TO HAVE
- Basic electronics knowledge

# SYSTEM ENGINEERING

## POWER BI DASHBOARD OPTIMIZATION

### Project Description

The project aims to optimize and transform our Power BI workspace by refining dashboards and reports, streamlining the workspace for enhanced usability, and enhancing dashboards to align with the company's updated branding—including new colors, fonts, and logo. Additionally, the project may include creating or optimizing databases to ensure seamless data integration and accurate reporting of key performance indicators (KPIs). This initiative will improve the visual appeal, functionality, and organization of our data visualization tools while ensuring that reports effectively highlight critical metrics and business insights. The project provides an excellent opportunity for an intern to develop advanced Power BI skills, gain hands-on experience in database management, and contribute to improving the company's reporting capabilities.

### Main Responsabilities

- Audit and re-organize existing dashboards and reports to identify and remove redundant or unused content.
- Update dashboards and reports to align with the company's new branding guidelines, including colors, fonts, and logo integration.
- Ensure consistency in design and layout across all dashboards and reports.
- Collaborate with team members to create or optimize databases for efficient data storage and retrieval.
- Work with stakeholders to confirm reporting requirements and align dashboards with business goals.

### MUST HAVE

- Proficient in creating, editing, and optimizing dashboards and reports;
- Strong understanding of Power BI workspace management and best practices;
- Basic knowledge of database creation, optimization, and integration;
- Ability to validate and troubleshoot data sources for Power BI dashboard;
- Strong attention to detail and ability to audit and organize content systematically;

### NICE TO HAVE

- Knowledge of DAX (Data Analysis Expressions) for advanced calculations and measures;
- Experience with SQL or other database query languages;

AUMOVIO

Iasi – the engineering team that gets things done, turning expertise into complete solutions.