

# Ziad Sameh Elnaggar

Mechatronics Engineering Undergraduate | Robotics, Embedded Systems & Control  
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## Education

### The German University in Cairo (GUC)

B.Sc. in Mechatronics Engineering

Cairo, Egypt

Oct 2023 - Jun 2028

- Ranked **3rd** out of **914** engineering students university-wide (Top **0.5%**).
- Cumulative GPA: **0.76** (German Scale, equivalent to **4.0**).
- Awarded the **Extra Exceptional Scholarship** by DAAD for top academic performance.

### Al Bashaer International School

IGCSE - High School Diploma

Cairo, Egypt

Sep 2020 - Jun 2023

- Achieved the **Highest Mark in the World** in Advanced Level Mathematics and Arabic.
- Graduated with a final score of **135.6%**.

## Technical Skills

**Robotics & Controls:** ROS 2 (Humble), Nav2, SLAM, PID Control, Gazebo.

**Embedded & Electronics:** FPGA (Xilinx/VHDL), STM32 (ARM), Embedded C, KiCad, LTspice.

**Software & AI:** Python, C/C++, Java (OOP/MVC), MATLAB/Simulink, TensorFlow, Git, Docker, Linux (Ubuntu).

**Mechanical Design:** SolidWorks, AutoCAD, Stress Analysis, Mechanical Product Design.

## Key Projects

### GUC-SAT 1: CubeSat Data System | FPGA, VHDL, AES-128

Nov 2025 - Dec 2025

- Designed and implemented a hardware-accelerated image compression and encryption pipeline using a **Raspberry Pi 5** bridged to an FPGA.
- Implemented **AES-128** encryption and Rice compression, achieving a **60%** throughput improvement over software-only execution.
- Selected to present system architecture at the Green AI Workshop (GUC x KIT x IEEE) based on technical merit.

### LiDAR Geospatial Feature Extraction | GenAI, Python, ML

Aug 2025

- Won **3rd Place** in the HERE Hackathon by building a feature extraction pipeline in under **48 hours**.
- Achieved **80% model accuracy** on LiDAR datasets despite limited training samples.

### High-Voltage EV Inverter (Shell Eco-Marathon 2026) | KiCad, STM32, Power Electronics

Jul 2025 - Oct 2025

- Engineered a 3-phase full-bridge inverter for a BLDC motor under high-voltage and current constraints for a Shell Eco-Marathon electric vehicle.
- Designed a custom PCB in KiCad with isolated high-voltage domains; validated circuit behavior using **LTspice**.
- Developed STM32 firmware managing 20kHz PWM switching with critical dead-time protection mechanisms..

### NeoJackaroo Game Engine | Java, JavaFX, OOP

Feb 2025 - Jun 2025

- Ranked **#1** out of **320** projects for code structure and technical implementation.
- Architected a scalable **MVC** codebase with 100% custom UI assets.

### Cura Club: Prosthetic Arm | Signal Processing, Leadership

Mar 2025 - Present

- Led and coordinated a multidisciplinary team of **15+** engineers across AI, Mechanical, and Embedded tracks as Technical Head.
- Designed and fabricated an in-house EMG-based Myo band sensor, reducing hardware costs by **50%** compared to commercial alternatives.

## Experience

### The German University in Cairo

Cairo, Egypt

Teaching Assistant

Sep 2024 - Present

- Mentored **20+** undergraduate students weekly in laboratory sessions, providing guidance in programming and experimental debugging.

### University of Stuttgart (IAS)

Stuttgart, Germany

Research Participant - Autonomous Mobile Robot Navigation

Nov 2025

- Engineered and deployed a full TurtleBot3 navigation stack strictly within a 2-week deadline at the University of Stuttgart.
- Tuned SLAM and AMCL algorithms to achieve sub-5cm localization precision in dynamic environments with moving obstacles.
- Optimized costmap parameters to eliminate navigation failures, enabling autonomous waypoint following.

### University of Stuttgart (IAS)

Stuttgart, Germany

Research Participant - Industrial Automation

Nov 2024

- Synchronized a **3-robot** heterogeneous system (Unitree Go1, Franka Panda, TurtleBot) for smart factory tasks.
- Developed ROS nodes to automate task allocation and data exchange.

## Honors and Certifications

- National Champion:** **1st Place** at RoboCup Junior Egypt 2024, qualifying for International Finals.
- 3rd Place:** Secured podium finish in IEEE Lab404 Hackathon out of **10+** competing teams.
- Certification:** Supervised Machine Learning (Andrew Ng, DeepLearning.AI), with hands-on assignments in regression and classification.