

AHMED HEKAL

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EDUCATION

Zewail City of Science and Technology

Sep 2017 - Jul 2022

B.ASc in Renewable Energy Engineering

Giza

Overall GPA: 3.56

Honors: *cum laude*

WORK EXPERIENCE

Labtronic Industries

Nov 2022 - Present

R&D Engineer

Giza

- Designed and implemented a foundational photovoltaic training system.
- Compiled Bill of Materials (BOMs) for diverse renewable labs (solar, wind, fuel cell, hydro, and hybrid systems), managing component selection, experiment planning, and project coordination.
- Developed technical proposals for multiple tenders requested by universities and offered recommendations to clients.
- Validated data from diverse systems and authored comprehensive technical manuals encompassing system objectives, theory, experiments, and technical specifications.
- Conducted analysis of governing equations for natural and forced convection through MATLAB coding and generated graphical plots to enhance understanding.
- Designed and manufactured diverse heat exchangers with a service unit that supplies hot and cold water.
- Collaborated with cross-functional teams to finalize the heat transfer trainer.

Bedo Innovation Education

Aug 2022 - Nov 2022

R&D Engineer

Giza

- Utilized Simulink to model a doubly fed induction generator with two voltage source converters and their controllers, and generated C code using Embedded coder tool within MATLAB.
- Designed and implemented a 285 watts Push-Pull converter used in renewable energy applications.
- Evaluated and determined appropriate components and devices required for each project, and developed corresponding (BOMs) detailing their specifications.

International Small Wind Turbine Contest hosted by TU Delft

Jan 2022 - Jun 2022

Electrical Team Member at Zewail City Eurys Team

Giza

- Successfully designed and implemented a 600 watts DC-DC boost converter.
- Conducted extensive testing of the PCB and analyzed various waveforms to ensure optimal functionality. Iteratively redesigned the PCB twice to improve performance and minimize power losses
- Collaborated with teammates to design a rectifier PCB, conducted generator open circuit voltage and short circuit current tests, collected data for the Rotor Speed vs Power curve, performed system simulations in MATLAB Simulink, and applied a control algorithm for Maximum Power Point Tracking.

Electric Vehicles Egyptian Rally "EVER" Competition

Jan 2020 - Dec 2020

Mechanical Team Member at Zewail City Racing Team

Giza

- Contributed to enhancing the system's performance and leading to a third-place finish in the competition.
- Provided effective leadership to a team of three members by assigning tasks, monitoring progress, and ensuring timely completion of deliverables.
- Utilized SolidWorks to design and fabricate a steering system for the competition.

TRAININGS

Siemens Energy and the Egyptian German Technical Academy (EGTA) Mar 2021-Apr 2021
Intern *Suez*

- Assembled and implemented various power electronics circuits, and utilized AC motors and oscilloscopes to display and analyze the obtained results.

PROJECTS

Design and Implementation of a Grid-Tied Small Wind Turbine Sep 2021-Jun 2022
Graduation Project *Grade: A*

- Designed and implemented a DC-DC boost converter PCB with a rating of 60V and 20A.
- Selected an appropriate inductor core and properly sized the inductor for optimal performance.
- Conducted research to identify and evaluate available MOSFETs in the market, and examined their datasheets to determine the most suitable one with the least losses.

Designing a Wind Power Plant Jan 2022
Wind Energy *Grade: A-*

- Utilized wind speed data from the site to determine the effective wind speed at the hub and designed the layout of wind turbines accordingly.
- Designed the cable length and size to minimize total annual energy losses, achieving less than 5
- Conducted radial power flow analysis using MATLAB to calculate the voltages at each wind turbine and the power injected at the medium voltage bus.
- Designed the reactive power compensation system in the substation to meet the capability diagram and maintain a power factor of 0.95.

Electric Vehicle Controller Design Jun 2022
Electric Vehicles *Grade: A-*

- Designed a controller using Bode plots to achieve desired closed-loop system performance.
- Verified the vehicle controller designed using MATLAB by plotting magnitude and phase responses of the system loop gain.

Designing a PV System Jan 2022
Photovoltaic Systems *Grade: B+*

- Utilized the Simulink PV array block to create a string of three modules connected to a boost converter.
- Implemented various MPPT algorithms, including Perturb and Observe and Constant Voltage, to optimize power output.
- Programmed an Arduino board to validate the results of the implemented algorithms in the lab.
- Developed an Excel spreadsheet to calculate the necessary number of modules for a grid-connected system and the required number of modules and battery storage for an off-grid system.

Desing and Simulation of a Grid Connected Voltage Source Converter Jan 2022
Special Topics in Advanced Generator Control *Grade: A*

- Utilized Simulink to design a two-level three-phase converter.
- Designed a current controller and phase-locked loop in the dq frame.
- Conducted various disturbances on both the averaged and switched models to analyze the resulting waveforms.

Simulating and Controlling a DC Shunt Motor Jun 2020
Electric Machines *Grade: P*

- Created a MATLAB Simulink simulation to design a DC shunt motor.

- Analyzed the results and optimized the performance by implementing a PID controller.

Simulating a Three Phase Fault in a Transmission Line

Jun 2021

Smart Grid

Grade: A-

- Constructed a Simulink model to represent the governing equations.
- Conducted simulations to analyze the model behavior, including the swing curve of the generators after clearing a fault.

Designing, Modeling, and Controlling a Boost Converter

Jan 2021

Advanced Control Systems

Grade: A-

- Designed a boost converter using MATLAB and Simulink.
- Developed control techniques to optimize the converter's performance and achieve improved results.

CERTIFICATES AND LICENCES

Interactive Course for Automotive Software AUTOSAR Application using MATLAB / Simulink

Ongoing

- Refreshed my skills in MATLAB, Simulink, and BMS through practical exposure.
- Gained proficiency in the ADAS system and Stateflow during the course.
- Explored and learned about AUTOSAR as part of the course curriculum.

Model Based Development-MBD- For Automotive using Simulink

Mar 2023

- Model Based Development-MBD- For Automotive using Simulink Certificate earned at March 6, 2023

Introduction to battery-management systems

May 2023

- Introduction to Battery management systems by University of Colorado Boulder on Coursera. Certificate earned at May 6, 2023

Power Electronics Specialization

Nov 2021

- Power Electronics by University of Colorado Boulder on Coursera. Certificate earned at November 13, 2021
- Acquired valuable skills in analysis, modeling, and simulation techniques, leading to practical engineering of high-performance power electronics systems.

Associate Mechanical Design

Jul 2020

- Associate Mechanical Design Certificate using SOLIDWORKS issued by Dassault Systemes. Certificate earned at July 30, 2020

McKinsey Forward Program

Nov 2023

- McKinsey Forward Program Certificate earned on November 27, 2023
- Completed McKinsey Forward online learning program, gaining skills for future success in a six-month course, and applied McKinsey's problem-solving approach, enhanced communication effectiveness, developed an adaptable mindset, and built a digital toolkit for the evolving work landscape.

VOLUNTEER WORK

IEEE Zewail City

2017-2018

- Head of organizers in Walking Robots competition.

VEX Robotics Competition at Cairo Stadium

2018

- Field Referee.