Department of Electrical and Electronics Engineering
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

Ref. No.: NITK/E&E/2023-21/A16 dated 19/01/2023 **24-05-2024**

Advertisement for Summer Internship

Applications are invited for the position of Summer Internship in a research and development project **(SERB-EEQ**) with the following details:

Title of the project:

"Sophisticated Optimised DC-DC Converter for Charging Electric Vehicle Using Reliable GaN devices and Planar Magnetics"

Principal Investigator:

Dr. R. Kalpana,
Associate Professor,
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National Institute of Technology Karnataka, Surathkal, Mangalore-575025,
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Name of the position: Student Internship

No. of Positions/Vacancies: One

Qualifications:
Essential Qualifications: - Candidate studying in Prefinal year or final year **B.E./B.Tech** in Electrical/ Electrical & Electronics with a minimum of 65% aggregate score (6.5/10 CGPA).

Desired Skills: -

- MATLAB/Simulink and Ansys.
- Design of Magnetics and development of power electronics hardware.

Age Limit: 25 years (Preferable)

Salary: Rs. 5,000/month

Duration: 2 Months

How to apply: Interested candidates must apply with the following documents (1) Cover letter (2) Bio-data with a passport-sized photograph, (3) Scanned copies of educational certificates and mark sheets in the google form. https://forms.gle/xctJyTG5foPt9gTy7
Only shortlisted candidates will be intimated by email and called for an **Online interview**. The position is available immediately. The appointment will be on a purely temporary basis co-terminus with the project.
Last date for applying: 14th June 2024

About the project:
Total duration: 3 Years (2023-2026)
Funding Agency: Science & Engineering Research Board (SERB)

Project summary:
Electric Vehicles (EVs) are receiving widespread attention around the world due to their improved performance and zero carbon emissions. The effectiveness of electric vehicles depends on proper interfacing between energy storage systems and power electronics converters. However, it is observedthat in EVs the power delivered by energy storage systems are unstable, unregulated and substantial voltage drops. The on-board DC–DC converter in EVs is used to connect the high- voltage battery with the low-voltage auxiliary system. With the advancement of auxiliary equipment in EVs, the output current of the DC–DC converter can be hundreds of amperes, which will cause high- conduction loss and severe thermal concern. This project aims to develop an efficient high power density power converter for charging electric vehicle by utilizing GaN devices and planar magnetics. The EV charger power converter will be designed to achieve minimum number of components, less switching stress, and highly efficient control system with minimum losses. Wide bandgap (WBG) semiconductors, such as silicon carbide (SiC) and gallium nitride (GaN), exhibit superior physical properties and demonstrate great potential for replacing conventional silicon (Si) semiconductors with WBG technology, pushing the boundaries of power devices to handle higher blocking voltages, switching frequencies, output power levels, and operating temperatures. An intelligent digital based control strategy will be developed for proposed converter to charge an EV battery. Intelligent control techniques are useful to control the DC-link voltage and load current as well as achieve bidirectional power management, proper coordination of energy storage systems, fast tracking, fewer steady-state errors and high efficiency. Further, an appropriate controller to enhance the robustness of nonlinear system and predictive analytical model toachieve good accuracy of SOC estimation will be investigated.
