

# Development of a DC-DC converter for the battery pack of a Formula Student vehicle

## OUR PROJECT

Formula Electric Belgium is a student-run electric race team which competes in Formula Student, the world's largest competition for engineering students. We aim to push the limits of performance, innovation and sustainability within electric racing every year, which is only possible with the help of our Thesis students. These pioneers are responsible for performance-defining innovations within the team, and we would love for you to join our team of highly ambitious and motivated engineers. As a Thesis student, you will research, design, prototype and test your innovations alongside the full-time members which make sure the team pushes itself and the car to new heights.

### AIM AND OBJECTIVE

The aim of this thesis is to design and develop a high-performance DC-DC converter for the battery pack of a Formula Student vehicle, capable of efficiently converting the high-voltage battery output to a stable low-voltage supply for auxiliary systems. The converter will interface with a 600 V LiPo battery pack and provide a regulated 24 V output with sufficient power to meet vehicle requirements. The system will focus on compact and lightweight power electronics design, high efficiency, and safe operation under automotive conditions.

#### Objectives:

- Design a suitable high-voltage to low-voltage DC-DC converter topology for a 600 V to 24 V application.
- Develop the power stage, control circuitry, and protection mechanisms for safe and reliable operation.
- Optimize the converter for high efficiency, low weight, and small physical size.
- Implement and test control strategies to ensure stable voltage regulation across varying load and input conditions.
- Evaluate the converter's performance in terms of efficiency, thermal behavior, and reliability through experimental testing and analysis.

### PROFILE

- Willingness to learn new technologies
- Education in Electronics-ICT
- Experience with PCB design (Preferably Altium Designer)
- Experience with power electronics

### RETURNS

- Practical experience in a high-end engineering context
- Work with the newest technologies and innovative companies
- Developing your hard- and soft-skills in a company-like environment
- Participation in the biggest student competition in the world

## INTERESTED?



Send us your contact details and field of interest to

[recruitment@formulaelectric.be](mailto:recruitment@formulaelectric.be)