The NXP CUP 2020
BUILD. PROGRAM. RACE.
The NXP CUP
The most successful autonomous robotics and automotive challenge in EMEA

Autonomy  Robotics  Automotive  Mechatronics  Teamwork  Coding  Challenge
2019 Season’s Facts
More than 400 students fighting for the championship

- 158 TEAMS
- 16 COUNTRIES
- 59 UNIVERSITIES
- 6 QUALIFICATIONS
- 1 EMEA FINALS
All students welcome

High School and STEM groups

Universities
Bachelor, Master, PhD

Robotic Clubs
Developed for Students

- **SUPPORT**: Ready to use courses and code snippets, community approach
- **SOFT SKILLS**: Helps to develop soft skills such as teamwork and project management
- **EMPLOYMENT**: Great addition to the CV and opportunity for networking
...and Professors

**THEORY-TO-PRACTICE**
Driving the motivation from students to apply their learning into a practical and exciting program

**MULTI-DISCIPLINES**
Teams of max 3 students with Electronic, Electric and Mechanical Engineering skills into one challenge

**LATEST TECHNOLOGIES**
Hands-on with the latest technologies for robotics and autonomous robotics
There are two default car chassis and development boards off the shelf. You pick!

**CHASSIS**

- DF Robot Brushless
  - incl. two Brushless DC motors, Servo, Camera Mounting
  - Starts from $92

- DF Robot Brush
  - incl. two Brushed motors, Servo, Camera Mounting
  - Your own choice
  - Bring your own car, no matter if 3D printed or different chassis supplier

**DEV BOARD**

- Vehicle Management Unit
  - Running on opensource software PX4
  - Special price!

- MikroE ARC board
  - with KL46 Microcontroller (similar to FRDM board)

**SENSOR**

- Pixy2 Cam
  - intelligent camera with chip on board
  - Starts from $60

- Parallax
  - Linescan Imaging Sensor
  - Documentation and support available

- Your own choice
  - Pick your own board from NXP (e.g. iMX or FRDM)
  - Your own choice
  - Pick your own camera
  - No or limited support available

**All cars and boards can be purchased via Mouser Electronics. Prices are not final yet! Landzo Model C and Alamak from previous seasons are allowed to the challenge.**
Courseware
Courseware created by professors in various languages to help integration into the classroom programs

- ARC Ingenierie Switzerland: Introduction course to automation systems - considerations for camera(s) positioning on the car chassis (Fr)
- ESIEE Paris, France: FRDM-KL25Z NXP Cup course material (Fr)
- University of Applied Sciences Mannheim, Germany: NXP Cup Courseware (Ger)
- NXP Flight controller RDDRONE-FMUK66 documentation

All course material can be found online
Courseware (cont.)
Courseware created by professors in various languages to help integration into the classroom programs

- Rose-Hulman Institute of Technology, Indiana, USA: NXP Cup Autonomous Driving Design Exercise book (En)
- University of Iasi, Romania: NXP Cup Design with MCU Lab exercises based on ARM mbed (Rom)
- Deggendorf Institute of Technology, Deggendorf, Germany: NXP Cup Car Implementation course (Eng)
- NXP Semiconductors, Texas, USA: The book of Eli (from Eli Hughues) 35 module video course based on FRDM-KL25Z applied to the NXP Cup (Eng)

All course material can be found online
Source code and programming support
The source code offers you a quick start. Take it from here and fine tune your car

- ARC Ingenierie Switzerland: ARC Board schematics, code samples, Labview support package for Model C and Alamak chassis

- NXP Semiconductors:
  - FMU board with 1 Brushless motor on Turnigy chassis
  - FMU board with 2 Brush motors on DFRobot chassis
  - FMU board with 2 Brushless motors on DFRobot chassis
  - ARC board with 2 Brush motors on DFRobot chassis
  - FRDM-KL46 with 2 Brush motors on DFRobot chassis

All course material can be found online
Source code and programming support (cont.)
The source code offers you a quick start. Take it from here and fine tune your car

- ARC Ingenierie Switzerland: ARC Board schematics, code samples, Labview support package for Model C and Alamak chassis

- NXP Semiconductors:
  - FMU board with 1 Brushless motor on Turnigy chassis
  - FMU board with 1 Brush motor on DFRobot chassis
  - FMU board with 1 Brushless motor on DFRobot chassis
  - ARC board with 1 Brush motor on DFRobot chassis
  - FRDM-KL46 with 1 Brush motor on DFRobot chassis

All course material can be found online
2020 season starting in October ’19

Highlights

**Multi Disciplinary**
Multi disciplinary approach for robotics, mechatronics and automotive

**Creativity**
All car kits, regardless of make, origin, source are allowed

**Open Portfolio**
Access to the whole NXP board solutions portfolio including K66-FMU, FRDM-KL25z and i.MX

**Champions board**
Get the board from the 2019 champions HE-ARC Ingenierie Switzerland

**New Car Chassis**
DFRobot new car chassis available via mouser.com
The Figure 8 is a precision and reliability task.
Participants will have 60 seconds to complete as many laps as possible.
The team with the most laps completed wins.
This challenge is optional.

**Speed limit**
When the car sees the beginning of the speed zone, it must reduce its speed significantly.
When the car sees the end of the speed zone, it must resume its original speed.
This challenge is optional.

**Obstacle avoidance**
After completing the first round, the jury will place an obstacle on one of the straight track segments.
The race car has to avoid this obstacle.
Neither the tires nor the chassis are allowed to touch the obstacle.
This challenge is optional.

**Timed Race**
The Race start order will be determined by a random drawing.
Fastest lap time wins this challenge.
This challenge is mandatory.

For all details about the scoring and rules of each challenge, please refer to the NXP Cup Rules guide.
2019/20 Key Dates

October
Registration opens
Get your kits!

November
End of Registrations
Start working on your cars
Racecar development and programming!

March
Qualifications
Choose your location

April-May
EMEA Finals
Win the NXP CUP 2020
Win

We invite all qualified teams to the multi-day technology event in Bucharest

Bucharest
Bucharest, Romania will be the site of next season’s NXP CUP Finals in EMEA

Travel voucher
Every team that qualifies will get a 200€ travel voucher per person

Accommodation
Mouser Electronics will sponsor accommodation and transfer in Bucharest

Food
Food will be provided to all finalists for free during the event

Party
Party with us on a multi-day technology event

Win
Winners will get 3000€. Plus there is an extra chance to win the Electromaker Innovation award!

Please see terms and conditions for details.