



International robotic competition „ROBO-VEHICLE PILSEN 2025“ 10 – 13 March 2025

The task of the competition teams will be to construct a robotic vehicle, present it to the jury in English and drive it along a defined track in the shortest possible time. The vehicle will transport a cup with a measured amount of water, which it must not spill. There will be competition in the categories of best ride, best design, best English language presentation and overall ranking.

The competition will take place face-to-face in Pilsen. In the event that the competition team could not participate in person, it will be allowed to participate online.

Teams of students from the Czech Republic, Slovak Republic, Croatian Republic, Federal Republic of Germany, Ukraine, People's Republic of China and the Republic of Turkey are invited to the competition.

The aim of the competition is to deepen cooperation between schools in the field of developing digital competences needed for the future labour market, to compare professional skills among schools across individual states and to gain new inspiration for competing pupils.

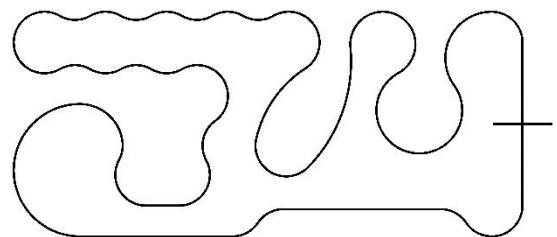
Teams

Each foreign school can enrol a maximum of three teams in the competition. Secondary schools in the Pilsen region can enter a maximum of two teams in the competition. The team consists of two students aged between 17 and 20. During the competition, teams work independently without the intervention of a teacher or an adult.

Technical specifications

Track specification

- ⦿ the base for the track is a white flat sheet measuring 2000 x 4000 mm, on which a closed curved loop is drawn in black - a curved guiding black line 15 mm wide, it does not intersect anywhere, it is not interrupted
- ⦿ the start and at the finish is formed by a black START/FINISH (same location) line with a width of 15 mm, which intersects the guiding black line
- ⦿ two obstacles are placed in the track - an unlit tunnel and guardrails on both sides of the guide line



Vehicle specification

- ⦿ maximum size of the vehicle including the cup (length x width x height): 200 x 200 x 200 mm
- ⦿ number of axles: unlimited
- ⦿ chassis: unlimited
- ⦿ engine power: unlimited
- ⦿ trolley drive: electric motors
- ⦿ wheels, tracks and other technical mechanisms of the trolley must not damage the track or the surface of the track

- the trolley must form a single unit

Vehicle control unit

- any platform (Arduino, Raspberry, LEGO, micro:bit, Odroid, ...)
- vehicle must be fully autonomous without any external control (wi-fi, Bluetooth etc.)

Fitting a water cup on the trolley

- placing the cup on the trolley: the cup will be placed in a ring-shaped lining, while the inner diameter of the lining will be slightly larger than the outer diameter of the bottom of the cup - the cup must stand completely freely in the lining, it must not be clamped by the lining, the inner height of the lining must not be higher than 1.5 mm. A free zone of minimum 25 mm must remain around the cup
- the mounting has a groove for attachment to the trolley using M3 screws; the groove allows clearance to attach the cup mount to the carriage
- it is not allowed to change the size or otherwise modify the fit of the cup
- the colour or the material from which the cup is printed does not matter (ABS, ASA, PET, ...)
- failure to comply with the specification of the robotic vehicle and cup attachment including a 25 mm free zone will be penalized in the best drive category by 30 seconds

ring-shaped trim

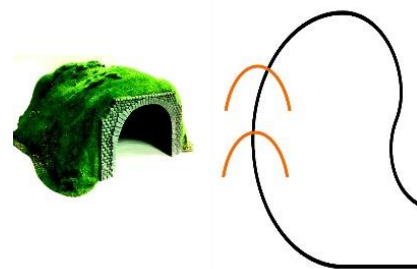


cup



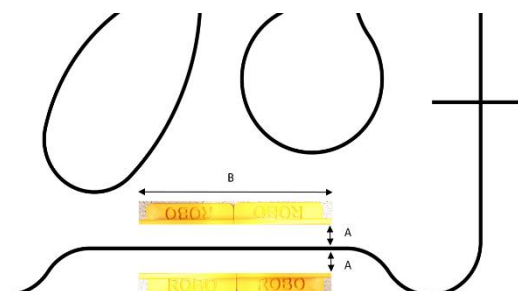
Tunnel

- is covered and unlit
- is firmly fixed to the track, in case the trolley does not pass
- through the tunnel, the vehicle must be placed on START/FINAL
- a guiding black line runs through the tunnel



Guardrails

- the guardrails consist of 4 opposite plastic walls with a length of 150 mm (TOTAL "B" 300 mm)
- the edge of wall "A" is 115 mm away from the edge of the guide line on each side (the gap between is 2 x 115 mm + the black guide line 15 mm i.e. TOTAL 245 mm)
- wall material: printed plastic, length 150 mm 4 pcs



Competition rules

Best ride category

Before the start of each team's competition, a measured amount of water - 70 ml - will be poured into the cup. If the water cup is knocked over, the vehicle must be placed at the start again and the cup must be refilled with the prescribed amount of water.

The robotic vehicle, transporting a cup with a measured amount of water, must pass the defined track in the shortest possible time without spilling the water in the cup.

The track is formed by a leading black curved line on a white background, it does not intersect anywhere, the start line also forms the finish line.

There are two obstacles in the track, an unlit tunnel and guardrails on both sides of the guide line.

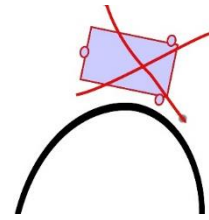
The competitor places the vehicle on the guide line in front of the black line crossing the track (START/FINISH), starts it manually so that the vehicle already passes the black line crossing the track (START/FINISH). After safely passing the track, including meeting other conditions, the vehicle must automatically stop behind the black line (START/FINISH) crossing the track. If the vehicle does not automatically stop behind the black line (START/FINISH) crossing the track, a penalty of 5 seconds will be added to the final time of this run.;

In the case of a complete departure of the vehicle from the black guide line (the vehicle leaves the black guide line with its entire chassis), or when the track is shortened, the vehicle must be placed at the start again.

Total time to pass the track including repositioning of the vehicle on START is 7 minutes. A competition team can use the full track time of 7 minutes.

Timing will be done electronically. The best time to pass the track will be entered in the score sheet.

The team with the shortest time to cross the track wins the category.



Best design category

Committee evaluates:

- 🕒 original fairing of the vehicle (colours, elaboration of parts, quality of parts, ...)
- 🕒 protection of electronics from water
- 🕒 interesting lighting (headlights, beacons, ...)
- 🕒 unusual sounds (beacon, warning sounds, ...)

Best presentation category

The competition team will prepare an electronic presentation in .pptx or .pdf format, with a maximum size of 100 MB. If these conditions are not met, the presentation will not start.

Competitors will present using a computer in conjunction with a data projector. The time range of the presentation is a maximum of 10 minutes. After the presentation, the evaluation committee has up to 5 minutes for questions. The team with the highest number of points wins the category.

Presentation must contain:

- 🕒 brief description of the vehicle
- 🕒 description of the most interesting technical parts and their solutions
- 🕒 greatest success in construction (electronics, design, mechanical construction, programming, adjustment, ...)
- 🕒 the biggest problem during construction (electronics, design, mechanical construction, programming, adjustment, ...)

- ☉ benefit for own professional development
- ☉ use of resources (web, literature, ...)

Evaluation

The valuation committee consists of the representatives of the University of West Bohemia and possibly other representatives of universities from the participating countries.

Committee will evaluate these categories:

- ☉ best ride
- ☉ best design
- ☉ best presentation
- ☉ overall ranking

Organizers of the competition

- ☉ Pilsen Region
- ☉ University of West Bohemia
- ☉ The Secondary Vocational School of Electrical Engineering, Pilsen, Vejprnicka 56
- ☉ Techmania Science Center, o. p. s.

Partners

- ☉ Techmania Science Center o. p. s.
- ☉ New technologies – Research centre, University of West Bohemia
- ☉ Faculty of Applied Sciences, University of West Bohemia
- ☉ Ladislav Sutnar Faculty of Art and Design, University of West Bohemia

Contacts

Organizational issues:

Mr. Jaroslav Sokol, Head of the Education Department at the Regional Authority of the Pilsen Region
jaroslav.sokol@plzensky-kraj.cz

Contact with schools:

Ms. Alena Altmanová, an officer in the Education Department at the Regional Authority of the Pilsen Region
alena.altmanova@plzensky-kraj.cz

University of West Bohemia

doc. Ing. Luděk Hynčík, Ph.D., director for international cooperation, New technologies – Research Centre, University of West Bohemia
hyncik@ntc.zcu.cz

The head of the evaluation commission:

doc. Ing. Miloš Železný, Ph.D., dean of Faculty of Applied Sciences, University of West Bohemia
zelezny@kky.zcu.cz

The Secondary Vocational School of Electrical Engineering, Pilsen, Vejprnicka 56

Václav Leba, vice director for practical teaching
lebavaclav@souepi.cz