

EUROPEAN BEST ENGINEERING COMPETITION

EBEC MOSCOW 2018

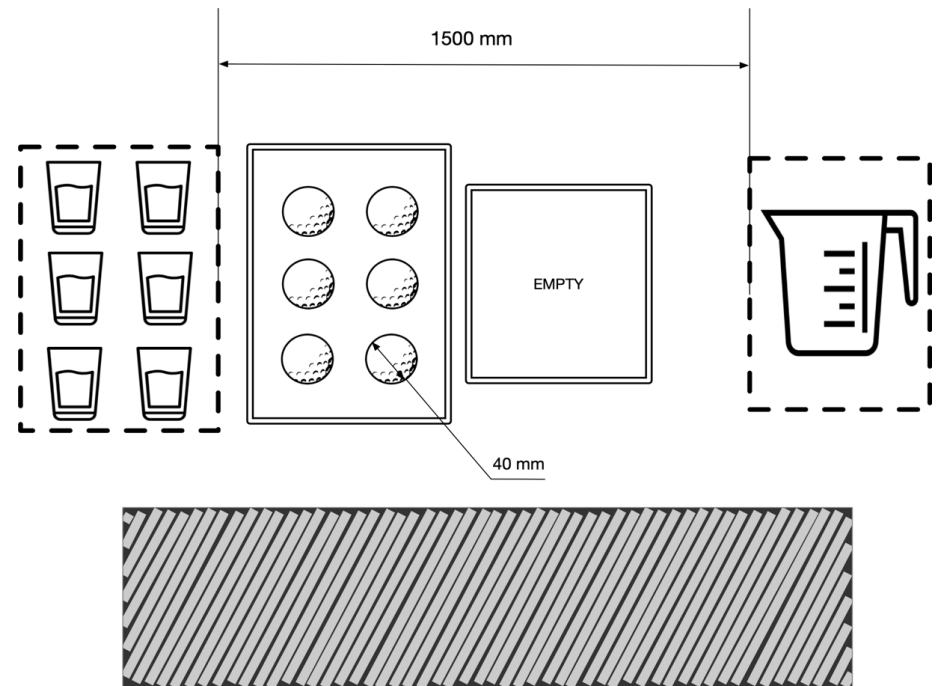
Team Design

Hello, dear participants! Congratulations with reaching the final stage of EBEC Moscow 2018! Are you ready to apply your knowledge in practice? Are you ready to turn on your imagination? Do you want to become a superhero? Be an engineer!

It's time to show, who is the real engineer here! Your task is to develop robotic arm. But if you had all the materials, motors and electronics, it would have been too easy. In conditions of shortage of materials, you have to construct mechanism that can deal with the Main Task and Extra Task.

Main Task:

You will have to bring all the ping pong balls you can from the bigger box to the smaller box. Bigger box parameters are 160*230*335 mm and smaller box parameters are 136*174*213 mm. They are situated next to each other (see scheme).



Control Center

Scheme of the Test Stand.

You will have 3 minutes for this task. For this task, you will get as many points as many balls you have managed to collect. If your manipulator broke down during the execution of the Main Task, you can fix it and have a second chance, but second chance will cost you 3 points. If you want to proceed to Extra Task, it will cost you 3 points.

Extra task:

Now you will have to pour the water from cups to measuring glass. Keep in mind, that distance between cups zone and measuring glass zone is 1.5 meters. You will get points for filling measuring glass. 5 points for 100 ml.

Evaluation:

Your score will be influenced by your completion of the missions, the assembly time and the Jury.

TP (Task Points) – for completing the tasks (see description of the tasks).

CP (Creativity Points) – the score from 1 to 10 is given by the jury for the creativity of the machine and how it is different from other machines presented by teams;

EP (Engineering Points) – the score from 1 to 10 is given by the jury for the complexity, engineering level and if the team has the knowledge to justify it;

PP (Presentation Points) – the score from 1 to 10 is given by the jury for the presentation of your prototype and the report you delivered and for the comments you made during the Final Testing. Both presentation and report are important and have the same evaluation

percentage.

DP (Design Points) – the score from 1 to 10 is given by the jury for design of manipulator.

PS (Project Score) – you will also be evaluated by the budget of your project. The team with the lowest budget will get 10 points, the second 9, the third 8, the fourth 7 points and so long. The team with highest budget will get 1 point.

Your total score is calculated in the following way:

$$\mathbf{SCORE = 0.5TP + 0.2CP + 0.15EP + 0.05PP + 0.05DP + 0.05PS}$$

Rules of the competition

General:

- It is forbidden to use mobile phones and internet
- It is forbidden to exchange any materials or tools with other teams
- The presentation lasts for no more than 2 minutes.
- The team has 2 attempts to complete the main task. Second attempt can be used only if manipulator broke down during first attempt.

* After completing the main task, team can take extra task.

* If you want to make any readjustment on the prototype during presentation or between attempts you will have to ask the Jury and you can only do it with their endorsement.

* The team has 1 attempt to complete the extra task.

* The team is not allowed to touch their manipulator and objects of the test stand. Team is only allowed to touch the parts that control manipulator.

* Only two members of the team can control manipulator during one attempt. However, members can switch between the attempts.

* Members, who control manipulator cannot leave the area called Control Center.

Shop:

You can pay in the shop by extracting points (EXP). The more points you spend, the less will be your project score (see evaluation). But don't be too greedy, it's better to spend more points and complete the task, than have your machine broken in the middle of competition.

- Shop opens at 11 a.m. and is opened during the whole event. You can buy materials in the shop while the shop is opened.
- Shop closes an hour before the end of the day scheduled.
- Any member of the team can approach the shop (in order to get familiar with the materials), but only CAPTAIN of the team can buy materials.

Tools:

- Only CAPTAIN can get the tools .
- When CAPTAIN gets a tool, he should tell the person on the issuing point .
- Only CAPTAIN returns the tool, he should attentively watch the tool to be struck off the team's list!
- Team is responsible in case of losing or damaging tools .
- It's forbidden to hand the tools over to other teams! The tools are to be returned immediately after use!

List of materials:

Material	Translation	Max. per team	Price (EXP)
Plywood (700x700x8 mm)	Фанера (700x700x8 мм)	1	100
Syringes 20 ml	Шприцы (20 мл)	4	20 per unit
Rope 1000 mm	Веревка (1000 мм)	2	5 per m
Clapboard (20x96x2000 mm)	Доска (20x96x2000 мм)	1	60
Wooden bar (40x20x2000mm)	Деревянный брус (40x20x2000 мм)	1	40
Wooden bar (40x40x2000mm)	Деревянный брус (40x40x2000 мм)	1	60
Tube (50 mm)	Трубка (500 мм)	3	30 per unit
Rubber band	Резинка	10	1 per unit
Straw	Соломенка	10	3 per unit
Tapping screw 32mm	Саморезы 32 мм	20	1 per unit
Tapping screw 19mm	Саморезы 19 мм	20	1 per unit
Nails	Гвозди	20	1 per unit
Screw-hook	Винт-крючок	4	5 per unit
Thick wire 1.8x1000mm	Проволока толстая (1.8x1000 мм)	5	20 per m

Thin wire 0.9x1000 mm	Проволока тонкая (0.9x1000 мм)	5	15 per m
Wooden rods	Деревянные стержни	8	5 per unit
Scotch tape	Скотч	1	40 per unit
Hinges	Шарниры (дверные петли)	5	20 per unit
Hot glue tube	Клей для клеевого пистолета	5	20 per unit
Bearing balls	Шарики подшипника	12	5 per unit
Plastic cups	Пластиковые стаканчики	5	5 per unit
Pins	Силовые кнопки	5	1 per unit
Mounting angle	Крепежный угол	5	10 per unit
Plastic clips	Пластиковые зажимы	5	2 per unit
Clamp	Хомут	10	2 per unit