



IMAGINATION TO REALITY

CATEGORY

FINAL STAGE RULES

BAKU 2025

Introduction

The “**Imagination to Reality**” category is designed to showcase and enhance engineering and technical creativity skills through the use of CNC (Computer Numerical Control) laser technologies. Participants will create digital models using *Computer-Aided Design* (CAD) software and then transform these models into functional and precise prototypes using CNC laser cutting machines powered by *Computer-Aided Manufacturing* (CAM) technology. This process enables participants to explore engineering approaches such as design precision, material selection, structural stability, and production strategies. At the same time, they strengthen their analytical thinking, spatial imagination, creative planning, and problem-solving skills. The main goal of the project is to foster students’ innovative thinking, technical creativity, and practical knowledge in digital manufacturing by developing their teamwork, communication, collaboration, and strategic planning abilities. Moreover, participants gain firsthand experience with modern technologies, helping them form an early understanding of potential future career paths.

1. Participation Requirements

- 1.1. Each team must consist of one team leader aged 18 or older and two participants aged between 13 and 15.** Each participants may join only one team and participate in only one category. The same team leader may supervise more than one team within the same category. A team leader (mentor) may also lead teams participating in different categories of International STEAM Azerbaijan Festival.
- 1.2.** All participating teams are considered to have accepted any modifications introduced by the International SAF 2025 Scientific Committee and to be in full agreement with all terms and conditions outlined in these regulations.

2.Code of Conduct for Participants

- 2.1.** Participating teams must follow the principles of fair competition, avoid disputes with other participants, refrain from using offensive language or engaging in any physical or provocative behavior, and must not intentionally damage other teams’ projects or take their belongings without permission. In case of a rule violation, disciplinary actions will be determined based on the nature and seriousness of the offense.

- 2.2. Participating teams must be aware of safety rules and must avoid any behavior that could put their own team members or other participants at risk.
- 2.3. During the competition, team leaders and accompanying persons are not permitted to enter the competition area or interfere in any way with the event. If a team leader or accompanying person provides informal or unauthorized assistance to their team, or interferes with the performance of other teams, the referee has the authority to issue a warning, disqualify the team, or impose appropriate disciplinary measures.
- 2.4. Each participant is allowed to compete in only one category. Duplicate registrations, falsified information, misrepresentation of age, unauthorized substitution of participants, and similar actions are strictly prohibited. If such violations are detected and officially confirmed, the participant shall be disqualified from the competition.
- 2.5. In the event of force majeure circumstances not covered by these rules, all decisions shall be made by the Organizing Committee.

3. Application Method

- 3.1. Applications will be accepted through the official website of the International STEAM Azerbaijan Festival. <https://saf.steam.edu.az/az>.

4. Final stage

4.1. Final Competition Format.

- 4.1.1. Teams that successfully pass the selection stage will earn the right to participate in the final competition, which consists of three stages. For the final competition, participants must construct a mechanical machine that operates using a gear system and assemble it on the competition field. The constructed machine must be able to move forward along the designated area. The stages are as follows:
 - 1. Inspection of prepared model parts and cutting of the gear system using the Snapmaker A250 device
 - 2. Assembly of the model and execution of its mechanical movement in the designated area (Test drives and final competition)
 - 3. Presentation, evaluation

4.1.2. Each team participating in the finals brings **pre-cut laser-cut model parts** to the competition area. The model parts brought to the competition area are inspected by the competition judges. Only materials specified in the technical requirements must be used in the model parts.

4.1.3. Teams will only perform on-site assembly and motion testing. **No pre-assembled models are allowed.**

4.1.4. Teams will additionally **print the gears of the moving mechanism on the racetrack** using the Snapmaker A250. This process must be performed on the racetrack.

4.2. Technical requirements of the model.

4.2.1. Model dimensions and materials:

20x20x20 in size;

Main materials: 3 mm thick plywood, 3 mm thick acrylic (or glass);

Auxiliary materials: Only elastic rubber (money rubber), glue, bamboo skewers;

Mechanism: Must be prepared using at least 2 gears and 1 flywheel (energy wheel);

4.2.2. The movement of the model must be provided mechanically by a wheel mechanism only. Electrical components or magnetic-based systems **are not permitted**.

4.2.3. Requirements for the model in the competition field

- A model that moves forward without a motor should be developed
- The movement should be transmitted through a gear system
- A flywheel (Energy wheel) should provide movement of the mechanism

4.3. Team preparation and presentation

4.3.1. Teams must submit a written document – “Engineering Notebook” – that includes a **technical description** of the model they submit, **the design and cutting process**.

The Engineering Notebook must be presented in a visual format and must include the following:

- Team information
- Project name

- Design sketches
- Technical methods and materials
- Project implementation plan
- Description of the mechanical system and mathematical calculations related to the wheel system
- Successes and challenges must be noted.

4.3.2. Team members are required to give an verbal presentation. The presentation should address the following points:

- The function and purpose of the model
- The division of work among team members
- An explanation of the mechanical principles involved
- The results achieved and possible areas for improvement

4.3.3. During the presentation, the team should be prepared for a question and answer session (technical and creative questions from the judges).

4.3.4. Since the team will be printing using the Snapmaker A250 machine at the competition site, they must bring the prepared file of the part to be printed and the software required to process this file on the A250 machine to their laptops in advance and bring it to the competition.

4.3.5. Race Map

Length: 3 m race track

Width: 0.5 m

5. Assessment

5.1. The prepared model and its presentation will be evaluated based on the criteria listed below.

Evaluation criterias		Point
1. The model must move a distance of 3 meters	1.1 1 - point for every 10 cm in the range of (0-1] meters	10
	1.2 2 – point for every 10 cm in the rage of (1-2] meters	20
	1.3 3 – point for every 10 cm in the rage of (2-3] meters	30
	1.4 Stability of the structure (the model moves without collapsing)	20
2. Engineering notebook	2.1 Presentation of model sketches, Explanation of the working principles of the mechanism in technical language, Noting the problems encountered and solutions	10
3. Presentation skills	3.1 Presentation of technical and creative work	10

Evaluation criterias	Point
Maximum POINT	100