

**Toronto Metropolitan University**

**Engineering Competition 2024**

**Junior Design Rulebook**

This competition challenges junior engineering students to design and build a prototype to address a technical problem. The Junior Team Design category is similar to the Senior Team Design competition, but emphasis is placed on prototype functionality rather than design theory.

## 1.1. Team Composition

The design teams must be comprised of a maximum of four (4) competitors. The team must be entirely comprised of students who have not yet started their 3rd engineering academic year by the time MEC starts.

## 1.2. Language

The presentation and any optional presentation materials can be done in either English or French but must be consistent in language.

## 1.3. Resources

### 1.3.1. Facilities Required

* One (1) amphitheater (presentation of problem and team presentations)
* One (1) large workroom, subdivided with partitions for each team or one (1) separate workroom per team
* One (1) centralized competition presentation/testing space (location will depend on the constraints of the design problem)

### 1.3.2. Personnel Required

#### *1.3.2.1. Judges*

A minimum of three (3) judges (and in any excess, an odd number of judges) are required to assess the problem-solving abilities, proposed solution, communication skills and team dynamics of the competitors. Judges in this category are not required to have a technical background, however, an understanding of effective presentation techniques and other engineering ‘soft’ skills are an asset.

#### *1.3.2.2. Competition Leads*

The Competition Leads are responsible, along with the VP Competitions, for the entire design and implementation of the competition. The Competition Leads must present the design problem at the beginning of the competition and answer any questions. Only the Competition Leads may answer questions during the design period. The Competition Leads will also answer any questions the judges may have during the competition.

#### *1.3.2.3. Official* *Timekeeper*

The Official Timekeeper is responsible for enforcing time limits during the solution development period and the presentations.

### 1.3.3. Equipment Supplied by MEC

The following equipment will be made available to all competitors during the competition time period:

#### *1.3.3.1. During* *the* *design* *phase*

* + - * + A design area with at least one (1) table, four (4) chairs and at least one (1) of a whiteboard, chart paper or blackboard
        + Paper and pencils/pens for writing
        + Any materials and/or tools specific to the design problem
        + Power source if powered tools supplied

#### *1.3.3.2. During* *the* *presentation*

* + - * + One (1) table
        + One (1) projector
        + Whiteboard(s) or blackboard(s)

### 1.3.4. Allowed External Resources

The competitors are allowed to bring the following equipment with them:

* Any textbooks, course notes, or other reference material
* Digital camera
* Each team member is allowed one computer
* Any additional tools, equipment and/or software as deemed fit by the competition director so long as it is reasonable to expect all participants to have access to said tools, equipment and/or software

Teams are allowed to bring their own PowerPoint templates for use in the competition, to be checked and approved by the Competition Leads. Templates may contain a theme with background images as well as a basic slide layout containing titles. Slides are to have no content other than a title and theme. Templates will be collected at registration time so they can be reviewed before the competition begins. Approved templates will be returned to competitors on a flash drive at the start of competition time.

**Note: The use of the internet to aid in the design process is prohibited.**

## 1.4. Procedure / Timeline

### 1.4.1. Pre-Competition

Prior to the competition, information about the rules of the competition will be available on the competition website, metengcomp.com.

### 1.4.2. Competition

#### *1.4.2.1. Presentation* *of* *Problem*

The problem will be presented to all competitors and judges at the beginning of the competition. The Competition Leads will provide detailed explanations of what is expected from the competitors, both orally and in writing.

#### *1.4.2.2. Question* *Period*

Competitors then have fifteen (15) minutes to ask the Competition Leads any questions they may have. Only the time used to ask the questions (not the answers) should be counted. The answers will be provided orally and recorded in written form.

#### *1.4.2.3. Development* *of* *the* *Solution*

The teams will have four (4) to six (6) hours (at the discretion of the organizers, length to be given to competitors at least seven days in advance) to develop their solution, produce all required deliverables, and prepare their presentation for the judges. All deliverables must be submitted to the Competition Leads before the allotted time expires. Competitors may finish before the end of the allotted time.

#### *1.4.2.4. Rest* *Period*

Competitors must be allowed a minimum of one (1) hour to rest before the presentation phase starts.

#### *1.4.2.5. Presentation* *and* *Tests*

Competitors have five (5) minutes to present their designs. All team members must be present and participate in the presentation. The original design, its rationale, a description of the design process, and a critique of the prototype are required presentation components. The judges then have a maximum of five (5) minutes to ask questions. The prototype will be available during the presentation. Each team will then carry out a set number of tests of their design. The number and length of tests must be dictated by the Competition Leads during the presentation of the problem. The testing may be carried out at the discretion of the Competition Leads.

### 1.4.3. Timekeeping

The following rules will be adhered to with respect to timekeeping.

#### *1.4.3.1. During* *the* *design* *phase*

* + - * + Time for the solution development period is started when all the teams have reached their work areas
        + The remaining time for solution development must be announced two (2) hours, one (1) hour, thirty (30) minutes, and ten (10) minutes before the end of the allotted time

#### *1.4.3.2. During* *the* *presentation*

* + - * + Time is halted when a judge asks or answers a question while the problem is being presented
        + Only the time used to ask questions during the question period is counted, not the time used to answer questions
        + The remaining presentation time must be indicated to the competitors two (2) minutes and one (1) minute before the end of the allotted time
        + A visual countdown must be given during the last thirty (30) seconds of the presentation to the judges
        + After the five (5) minute presentation time, the competitors will have a fifteen (15) second grace period to conclude their presentation before they are cut off to begin the question period

### 1.4.4. Presentation Order

* Presentation order shall be determined randomly
* Presentation order shall be announced thirty (30) minutes before the presentations commence. All teams are required to be present at this announcement
* Teams are not allowed to switch places in the presentation order
* Teams may not be in the audience for presentations of their competition until after they have completed their presentation. Any attempts at entering the presentation room before their allotted time will result in a warning for a first offense, and a ten (10) point penalty for any further offenses

### 1.4.5. Deliverables

Each team is required to submit a prototype of their design before the end of the design period. This design will be used to test the team’s solution to the design problem. Each team is required to electronically submit a presentation about their design before the end of the design period. The requirements of the presentation will be outlined in the problem design package.

### 1.4.6. Response to Questions

* Only the Competition Leads may answer questions during the problem presentation and design phases. Volunteers and judges may not answer questions regarding rules and procedures at any time
* During the presentation of the problem, the Competition Leads shall answer orally and write down the answers provided
* During the design phase, only questions related to deliverable content shall be answered. No answers shall be provided in response to questions about the problem that might lead to the development of a new approach or which might invalidate a solution
* During the design phase, answers to questions shall be provided in writing to all teams at the same time. Fifteen (15) minutes may be allowed to elapse for a significant number of questions accumulated before responses are provided. A copy of the responses must be provided to the judges prior to the presentations

## 1.5. Assessment and Judging

* The panel must have an odd number of judges
* The panel must have at least three (3) judges
* The assessment shall be carried out in the audience's presence
* Feedback forms shall be provided to each team following the announcement of winners but prior to the end of MEC

Junior Design Rubric

| **PROJECT** | | **/70** |
| --- | --- | --- |
| Design Quality | * Does the design meet the requirements? * Does the design look presentable? | /15 |
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| Economic Feasibility | * Were the economics of the design evaluated? * Is the design economically feasible? * Is the design cost effective? * Is the design efficient | /15 |
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| Technical Feasibility | * Does the prototype or model work? * How well did the prototype perform? * Is the design practical? | /15 |
| Innovation | * Does the design differ substantially from existing designs? * Was the team inventive in their design and use of materials (utilized various materials)? | /15 |
| Additional features | * Do the features increase the functionality of the design? [/5 per feature] | /10 |
| **PRESENTATION** | | **/30** |
| Visual Aids | | /5 |
| Design Process, Justification and Critique | | /10 |
| Voice, Articulation and Timing | | /10 |
| Response to Questions | | /5 |
| **TOTAL** | | **/100** |

| **Point Penalties** | |
| --- | --- |
| Plagiarism | Elimination |
| Insufficient citation | -50 |
| Documents received after deadline | -50 |
| Absent team member | -25 |
| Entering presentation room before allotted time (after first offense) | -10 |
| Design is based off of an impossible concept | -50 |
| Design makes no attempt to solve the problem within the constraints of the problem statement | -50 |
| **Total** |  |