

**Toronto Metropolitan University**

**Engineering Competition 2024**

**Senior Design Rulebook**

A team of four (4) students are given a complex engineering problem and are instructed to design and assemble a working prototype. The teams will then present their solution and test their prototypes in front of a panel of judges.

1.1. Team Composition

The Senior Design team will comprise a maximum of four (4) competitors.

1.2. Language

The presentation and any optional presentation materials will be done in English.

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) competition/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 competitors' problem-solving abilities, proposed solutions, communication skills, and team dynamics. Judges in this category should have some technical engineering experience.

*1.3.2.2. Director*

The Competition Coordinators is responsible, along with the VP Competitions, for designing and implementing the Senior Team Design competition. The director must present the design problem at the beginning of the competition and answer any questions. Only the director may answer questions during the design period. The director 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 presentations.

*1.3.2.4. Volunteers*

A minimum of five (5) volunteers are recommended to carry out various support tasks during the design duration. A minimum of two (2) volunteers are required during the presentation and testing phases. Volunteers will be supervising all rooms during the build time.

1.3.3. Equipment Provided 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 room with at least one (1) table, four (4) chairs and a whiteboard/ blackboard
* Paper and pencils/pens
* Any materials and/or tools specific to the design problem

*1.3.3.2. During the presentation*

* One (1) Digital projector
* One (1) computer to load presentations
* One (1) table
* Whiteboard(s) or blackboard(s)
* Team project prototype

1.3.4. Allowed External Resources

The competitors are allowed to bring the following equipment:

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

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

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 must be presented to all competitors and judges at the beginning of the competition. The Competition Coordinators must explain what is expected from the competitors, both orally and in writing.

*1.4.2.2. Question Period*

Competitors have fifteen (15) minutes to ask the Competition Coordinators any questions they may have. This occurs during the competition briefing, after the presentation of the problem. Time should only be counted for asking questions, not for answering them.

*1.4.2.3. Development of the Solution*

The teams will have eight (8) to ten (10) hours to develop their solution, produce all required deliverables, and prepare their presentation for the panel judges. All competitors must submit all deliverables to the Competition Coordinators 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*

The presentation schedule will be posted precisely (30) minutes before the first presentation. All teams are required to be present at this time. Competitors have fifteen (15) minutes to present their designs. All team members must be present and participate in the presentation or be penalized by the judges. The competitors must present the original design, its rationale, a description of the design process, and a critique of the prototype. The judges then have fifteen (15) minutes to ask questions. Each team will carry out two tests of their design (or an alternate number of tests specific to the design problem, at the discretion of the Competition Coordinators). The testing may be carried out at the discretion of the Competition Coordinators.

1.4.3. Timekeeping

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

*1.4.3.1. During the design phase*

* Time is started when all the teams have reached their work areas during the development of the solution
* The remaining time must be announced three (3) 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 a question during the presentation
* The remaining time must be indicated to the competitors five (5) minutes and one (1) minute before the end of the allotted time for the presentation to the judges
* A visual countdown must be provided during the last thirty (30) seconds of the presentation to the judges. Presentations may not exceed the allotted time and will be cut off promptly at the expiration of the visual countdown. Teams that are cut-off will be penalized

1.4.4. Presentation Order

* The presentation order shall be determined randomly
* The 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 the first offense and a ten (10) point penalty for any further offenses

1.4.5. Deliverables

*1.4.5.1. For Competitors*

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

*1.4.5.2. From Competitors*

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

1.4.6. Response to Questions

* Only the Competition Coordinators 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 Coordinators shall answer orally and write down the answers provided
* The competitors shall answer only questions related to deliverable content during the design phase. 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 many questions accumulated before responses are provided. A copy of the responses must be provided to the judges before 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 judges should be bilingual, or the room should be equipped for simultaneous translation
* The assessment shall be carried out in the audience's presence
* Competition Coordinators will develop specific penalties for violations of rules, which will be provided to competitors in the competition briefing
* Testing will be officially video recorded to allow for fair resolution of any disputes
* Feedback forms shall be provided to each team following the announcement of winners but prior to the end of MEC

Senior 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** |  |