



ONTARIO ENGINEERING COMPETITION 2024

OFFICIAL RULEBOOK

Queen's University is situated on the territory of the Haudenosaunee and Anishinaabek.

Ne Queen's University e'tho noŋwe nikanónhsote tsi noŋwe ne Haudenosaunee tánon Anishinaabek tehatihsnónhsahere ne óhontsa.

Gimaakwe Gchi-gkinoomaagegamig atemagad Naadowe miinwaa Anishinaabe aking.

For more information on the history of this land, and why it is important to acknowledge this land and its people, please see this link to the Queen's Encyclopedia page: <https://www.queensu.ca/encyclopedia/t/traditional-territories>



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1. General Rules and Definitions

1.1. Definitions

- 1.1.1. “Engineering Student Societies’ Council of Ontario” henceforth referred to as ESSCO, refers to the provincial association of undergraduate engineering student societies in Ontario.
- 1.1.2. “Ontario Engineering Competition” henceforth referred to as OEC, is the annual ESSCO activity comprised of an undergraduate engineering competition outlined in this document.
- 1.1.3. “Internal Qualifier(s)” refer to the competitions held by ESSCO member schools which are eligible to send competitors to the OEC.
- 1.1.4. “Chair(s)” refers to the person(s) in the role of overall coordinator/chair of the OEC.
- 1.1.5. “Organizing Committee” refers to the team who oversees and organizes the competition as a whole.
- 1.1.6. “OEC Advisory Board”, henceforth referred to as the OECAB, refers to the body that provides advice, guidance, and support to the OEC Organizing Committee and is the final ruling authority on issues that will affect more than one OEC.
- 1.1.7. “Vice President of Competitions” henceforth referred to as VP Competitions, or equivalent position refers to the role that oversees all the Competition Leads and all overarching responsibilities related to the competitions.
- 1.1.8. “Competition Lead(s)” refers to the role responsible for the specific competition within a competition section of the rulebook. The Competition Lead(s) are appointed or chosen by a process set forth by the Co-Chairs. The Competition Leads are the primary means of contact for competitors, judges and a liaison between the organizing committee.
- 1.1.9. “Rules Violation Appeals Committee” is a committee to which competitors can appeal a decision regarding (a) rule violation(s) and is defined in Section 1.8 (Violation of Competition Rules).



1.2. Eligibility

- 1.2.1. The VP Competitions or Co-Chairs determines the eligibility of all competitors, teams, and projects according to the following guidelines set out in this rulebook.

1.3. Qualification

- 1.3.1. The competitors, teams, and projects must have qualified during an internal qualifying round hosted by an active member school of ESSCO or an OEC only member of ESSCO.
- 1.3.2. First place teams from internal qualifiers are eligible to compete.
- 1.3.3. If a first-place team cannot attend OEC due to medical, personal, or other legitimate reasons the second or third-place team from the same internal competition may be invited to attend OEC at the discretion of the VP Competitions and if they fit the criteria outlined in the document.
- 1.3.4. The teams from the internal qualifying rounds that are moving on to OEC must be composed of members representing the same member school of ESSCO in order to receive an invitation to OEC.
- 1.3.5. The teams at any internal qualifier that are moving on to OEC must be composed of members representing the same active member school of ESSCO in order to receive an invitation to OEC.

1.4. Competitors

All competitors must be enrolled in a Canadian undergraduate engineering program at an ESSCO member school, with at least half of the competitors comprising the team in an accredited engineering program at the time of the competition with the following exceptions:

- 1.4.1. In the cases of Innovative Design and Engineering Communications, competitors may have graduated within a year prior to the competition provided the project entered was completed before graduation. A letter will be required from the supervising professor confirming that no changes have been made to the project since the competitor's graduation. This letter must be dated no more than 30 days prior to the competition and be submitted to the VP Competitors or Chairs.
- 1.4.2. Competitors not presently enrolled in classes, or on co-op are still eligible provided they are considered an enrolled/active student by their institution or, the elapsed time has not exceeded one (1) year.

1.5. Project

- 1.5.1. For the competition categories of Engineering Communications and Innovative Design only



original projects, which are the work of the competitors, and with all contributing sources cited, may be entered.

- 1.5.2. For the competition categories of Consulting Engineering, Junior Design, Senior Design, and Bio-engineering, only work conducted by the competitors during the allocated competition time, with all contributing sources cited, and using only the material outlined by the Competition Lead, may be entered.
- 1.5.3. For the competition category of Re-Engineering the work submitted for Phase I/Case I (to be completed prior to the competition) must be all original reports, which are the work of the competitors, and with all contributing sources cited. For Phase II/Case II (to be completed during the competition) only work conducted by the competitors during the allocated competition time, with all contributing sources cited, and using only the material outlined by the Competition Lead, may be entered.
- 1.5.4. For the competition category of Programming, only an original solution conducted by the competitors during the allocated competition time (except for macros and environmental setups are fine), and that is the work of the competitors may be entered. All contributing sources (including open-source and freely available modules used in solution) must be cited.
- 1.5.5. Work done during employment related to the engineering degree is also eligible provided that an authorization letter is obtained from the employer allowing the work to be presented at the competition. The work must also meet other eligibility criteria.

1.6. Substitutions

- 1.6.1. The team appearing at the OEC must be comprised of the whole original team as it competed at its respective regional competition.
- 1.6.2. If a competitor is unable to attend the competition due to medical, personal, or other legitimate reasons, the team may compete in his or her absence as a reduced team or may find a suitable replacement provided that they meet all of the qualifications as outlined in this document. This may only be done in cases of teams with three or more members and at the discretion of the VP Competitions.
- 1.6.3. If a competition team is unable to meet the criteria in this document, the next runner-up team from the same internal competition shall be eligible to compete.

1.7. Regulation Amendments

- 1.7.1. These general regulations shall be considered the official regulations of the Ontario Engineering Competition, an activity run by the Engineering Students Society Council of Ontario (ESSCO) students. These regulations can only be amended with the approval of the Ontario Engineering Competition Advisory Board.



1.8. Violation of Competition Rules

1.8.1. If a competitor is believed to have violated:

- A rule in this rulebook,
- A rule included in the problem statement given to competitors explaining their challenge, or
- A clarification to a rule provided by a Competition Lead during the question period

The following process will ensure that the issue comes to a result that is fair to all parties involved.

1.8.2. The Competition Lead will determine if competitor(s) are in violation of the rules. If competitor(s) are found guilty of a violation during the design phase they will be notified immediately, although they are eligible to continue the competition and work on their solution.

- Competitors will be provided in writing the alleged violation of the rules following the design phase.
- This communication of a rule violation shall be reported to the team by the Competition Lead (or an acting representative) to ensure the competitor(s) are immediately made aware of the situation.

1.8.3. If competitor(s) are found guilty of a violation following the conclusion of the design phase, and either before, after, or during the presentation and testing phases, competitors have one (1) hour to appeal the Competition Lead decision to the Rule Violation Committee (RVC). The appeal must be written and clearly explain why the competitors believe they followed the rules of the competition. Appeals shall be limited to one page with size 12 font single spaced. Competitors will be provided in writing the alleged violation of the rules following the design phase. This communication of a rule violation shall not be an email or text message to ensure the competitor(s) are immediately made aware of the situation.

1.8.4. If the competitor is not found to be in violation of any rules, then the competition will continue as normal. If the competitor is found to be in violation of any rules, then the competitor will be penalized. The severity of the penalty shall be established rather as outlined in the OEC rulebook or at the discretion of the RVC.

1.8.5. The RVC shall comprise of the Vice President of Competitions and 3 other executive members. (One executive member will act as non-voting chair.) It is preferred that the Co-Chairs of the Ontario Engineering Competition are among the voting members of the RVC. The RVC will have one (1) hour to review the appeal and vote to dismiss or hold the Competition Lead's decision.

1.8.6. Competitor(s) will be immediately notified of the RVC decision. The decision of the RVC is final, and not subject to further appeals.



1.8.7. In the event of discovery of a rule violation following the competition, competitor(s) will be immediately notified and have one (1) hour to appeal and follow the procedure outlined in section 1.8.3.

1.9. School Anonymity

1.9.1. No information in a team's presentation may refer to the team's identity or respective school. If the identity of a team is revealed to the judges at any time through the competitors' presentation, the first offense will result in a ten (10)-point penalization, and the second will result in disqualification. In the case of Parliamentary Debate, revealing the team's identity or respective school will result in the loss of the current round at the moderator's discretion.

1.9.2. Presenters and debaters are also forbidden from wearing any apparel bearing the name, crest, colors, or other identifying symbols of their respective schools. Failure to follow this rule will result in immediate disqualification.

1.9.3. When submitting deliverable files (such as presentations or reports), the file content and filename must not disclose the name of the team's school. If the identity of a team is disclosed in the presentation slides or filename, the presenting team will be penalized with a loss of ten (10) points. Instead, each team shall name its files using the team name assigned to the team and the case subject as below:

Correct: TEAM_1_CONSULTING.ppt

Incorrect: MANITOBA_ENGINEERING.ppt

1.9.4. Delegates and audience members associated with competing schools are forbidden from revealing - explicitly or implicitly - a school's identity in any of the presentation rooms at any time. This ban includes but is not limited to apparel, signage or any other material that bears the name, crests, colors or other identifying symbols of a competing university. This is in place to avoid any prejudice or favoritism towards a given team by the judges. The team associated with an individual who breaks this rule is subject to a loss of ten (10) points.

1.10. Language

1.10.1. Official Languages

The official language of the OEC is English; French is recognized as a secondary language that will be accommodated upon request. The OEC will provide all documentation in English; it is implied that all presentations, projects, and communication will be done in English. However, the OEC recognizes that competitors may so choose to compete in French.

1.10.2. Translation

At the time of registration, competitors must notify the Organizing Committee that they so choose to compete in French. The Organizing Committee will then provide all requested documentation in French and provide live translation and any and all other required equipment to make the competition fair and feasible for the competitor.



2. Consulting Engineering

The purpose of the Consulting Engineering competition is to challenge competitors to design a detailed solution to a large-scale engineering problem. The proposal must be made in a way that promotes the solution to the client (in the form of judges). Competitors must demonstrate resourcefulness while acting in good faith with the spirit of the competition.

2.1. Team Composition

The Consulting Engineering team will be comprised of a maximum of four (4) competitors.

2.2. Topic

It is recommended that the topic incorporate more than one engineering discipline. However, while the topic should challenge competitors' technical knowledge and skills, it should also require competitors to evaluate the economic, environmental, political and social implications of their proposed solutions and address the requirements of the customer. The winning solution will not necessarily be the most technically effective solution, but the solution that has the most real-world applicability and forethought. Therefore, the topic should be one that could exist in the real world. Topics drawn from reality must be fully documented. All necessary documentation must be provided to the competitors when the problem is presented.

2.3. Language

The presentation and report can be done in either English or French. The presentations and report must be consistent in language.

2.4. Resources

2.4.1. Facilities Required

- One (1) amphitheater (presentation of problem and team presentations)
- One (1) workroom per team (design of solution)

2.4.2. Personnel Required

2.4.2.1 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 should come from a variety of backgrounds including communications, sales and technical or consulting engineering experience related to the topic.



2.4.2.2. *Competition Leads*

The Competition Leads are responsible, along with the VP Competitions, for the design and implementation of the Consulting Engineering competition. The Competition Leads must present the design problem at the beginning of the competition and answer any questions raised by competitors. 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.

2.4.2.3. *Official Timekeeper*

The Official Timekeeper must be responsible for enforcing time limits during the question period, solution development and presentations, as stated in the rules.

2.4.3. Equipment Provided by OEC

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

2.4.3.1 *During the design phase*

- A workroom or workspace
- Paper and pencils/pens for writing
- A method to submit the team presentation
- Internet connectivity
- Some information relevant to the design problem, at the discretion of the Competition Leads

2.4.3.2 *During the presentation*

- One (1) digital projector
- One (1) computer containing the team's presentation file
- Whiteboard(s) or blackboard(s)

2.4.4. Allowed External Resources

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

- Any background research conducted by team members prior to the competition
- Any electronic material stored on CDs, USB keys, disks or other storage devices
 - Please check with the organizers to make sure the format of your electronic information will be accessible using the computers provided by OEC
- Any textbooks, course notes or other reference material
- Each team member is allowed one computer



Note: Since the use of the Internet and other external resources is permitted in this competition, all information used by competitors must be referenced very carefully. Competitors are not permitted to submit work completed by anyone other than the members of their team. If there is any evidence that competitors are submitting plagiarized work, the entire team will be eliminated from the competition and their home schools will be notified. Volunteers will monitor each team during the design process to deter teams from cheating, however, competitors are expected to act in good faith with the spirit of the competition.

2.5. Procedure / Timeline

2.5.1. Pre-Competition

At least seven (7) days prior to the competition, the main theme(s) of the competition will be announced to the competitors, judges and public. Assigned Team Names and exact specifications of equipment available to teams during the competition (computers storage devices, available programs, etc.) will also be announced at this time.

2.5.2. Competition

2.5.2.1. *Presentation of Problem*

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

2.5.2.2. *Question Period*

Competitors then have fifteen (15) minutes to ask the Competition Leads any questions. Only the time used to ask the questions (not the answers) should be counted in the fifteen (15) minutes. Time used by judges to pose questions will not be counted.

2.5.2.3. *Solution Development*

Teams will be given four (4) to eight (8) hours (at the discretion of the organizers, length to be given to competitors at least seven days in advance) to develop their solutions, produce all required deliverables, and prepare their presentations. All deliverables shall be submitted to the competition director before the end of the allotted time. Competitors may finish before the end of the allotted time.

2.5.2.4. *Rest Period*

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



2.5.2.5. *Solution Presentations*

Competitors will have a maximum of fifteen (15) minutes to present their solutions. All team members must be present and participate in the presentation or be penalized by the judges. Judges then have a maximum of ten (10) minutes to ask questions. Judges can ask a question at any time during the presentation. The clock must be stopped during these interruptions. In order to ensure that all competitors cease to work on the case solutions once the design time has ended, the competitors cannot include any material in their oral presentation which is not included within their submitted written reports or presentation materials.

2.5.3. *Timekeeping*

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

2.5.3.1. *During the design phase*

- Time is started when the teams leave the competition briefing
- 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

2.5.3.2. *During the presentation*

- Time is halted when a judge asks a question during the presentation
- Time is halted when a team member answers a question asked by a judge
- The remaining time must be indicated to the competitors ten (10) minutes, five (5) minutes and one (1) minute before the end of the allotted time for the presentation to the judges
- A countdown presentation that is visible to both the judges and presenters must be given during the last thirty (30) seconds of the presentation

2.5.4. *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



2.5.5. Deliverables

2.5.5.1. *For Competitors*

Each competitor will electronically be given access to a package outlining the main themes of the competition seven (7) days in advance of the competition. This theme will also be posted on the official OEC website. It is the competitor's responsibility to ensure that they have received the package.

At the competition briefing, each team will receive a package outlining the problem definition, design and presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Leads.

2.5.5.2. *From Competitors*

Each team is required to submit, electronically, before the end of the design period, a report of less than ten (10) pages (not including appendices) detailing their proposed solution. The report will be made available to the judges before each team's presentation. The report requirements will be outlined in the problem design package. Each team is required to submit, electronically, before the end of the design period, a presentation about their proposed solution. The requirements of the presentation will be outlined in the problem design package.

2.5.6. 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



2.6. Assessment and Judging

- The panel must have an odd number of judges
- The panel must have at least three (3) judges
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC

2.6.1. Judging Matrix

Solution	Addresses Problem Statement Environmental, Social, and Economic Analysis Technical Feasibility Real-world Applicability	/60
Report	Clarity Writing Style and Professionalism Deliverable Compliance with Expectations	/15
Presentation	Voice Articulation and Timing Visual Aids Response to Questions	/25
Penalties	Plagiarism	-50
	Insufficient Citation	-50
	Documents Received After Deadline	-50
	Absent Team Member	-25
	Verbal Disclosure of School During Presentation	-10
	Disclosure of School in Presentation Files/Documents	-10
	Disclosure of School by Supporting Audience Members	-10
Total		/100



3. Engineering Communications

The goal of this competition is to describe an engineering topic (i.e. process, product, device, issue) in terms that the general public can understand.

3.6. Team Composition

The Communications Design team will be comprised of a maximum of two (2) competitors. Should the presenting team be a subset of a project team, the remaining members of the project team must sign a letter authorizing presentation of the project in order for it to be eligible for the competition. This letter must be submitted with the competition abstract if applicable.

3.7. Topic Eligibility

The topic should fulfill the following criteria:

- The topic must be technical in nature
- The presentation will assess social, environmental, political, and economic impacts of the topic

3.8. Language

The presentation and abstract can be done in either English or French. The presentations and abstract must be consistent in language.

3.9. Resources

3.8.1. Facilities Required

- One (1) amphitheater for presentations

3.8.2. Personnel Required

3.8.2.1. Judges

A minimum of three (3) judges (and in any excess, an odd number of judges) are required to assess the communication skills of the competitors. Judges in this category should have some experience with communications and public speaking. Judges are not required to have any technical engineering experience.

3.8.2.2. Competition Leads

The Competition Leads are responsible for the implementation of the Engineering Communication competition. The Competition Leads must be present at all of the presentations and be available to competitors and judges at any time for questions and requests.

3.8.2.3. Official Timekeeper

The Official Timekeeper is responsible for enforcing time limits during the presentations. This role can be run jointly with the Competition Leads.



3.8.3. Equipment Provided by OEC

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

- One (1) digital projector
- One (1) table
- Blackboard(s) or whiteboard(s)

3.8.4. Allowed External Resources

Competitors are required to bring any presentation materials which they will use, including pictures or diagrams and models or prototypes.

3.8.4.1. Resource Request

Prior to the competition, the team may submit a resource request. The purpose of this request is if teams require resources outside of those listed in Section 3.8.4. (Equipment Provided by OEC). The Competition Lead will review the requests and determine if the request is viable. Team will be informed early in the week before the competition is their request can be accommodated. This request will follow conventional formatting characteristics (12-point font, 1.5 line spacing, 1" paper margins) and is limited to one (1) page. The request must include, but is not limited to:

- Team Name
- Team Members
- School and team A/B if applicable
- Reason for required resource

3.9. Procedure / Timeline

3.9.1. Pre-Competition

7 days prior to OEC	<p>Presentation Abstract</p> <ul style="list-style-type: none"> • 200 word abstract, detailed in Section 3.9.6. (Deliverables) <p>Layout and Specific Needs</p> <p><i>Competitors must convey the following information to the Competition Leads:</i></p> <ul style="list-style-type: none"> • Any specific needs (layout, electrical, power supply, etc.) must be specified via Resource Request, detailed in Section 3.8.5. (Allowed External Resources) <p>Presentation Slides</p> <ul style="list-style-type: none"> • Each team must submit a soft copy of their presentation slides to the Competition Leads, detailed in Section 3.9.6. (Deliverables)
12 hours prior to OEC	<p>Competition Briefing</p> <ul style="list-style-type: none"> • The Competition Leads will host a competition briefing, attended by the competitors and judges, where details of the competition timeline and judging structure are discussed. There will be time allowed for questions.



3.9.2. Competition

3.9.2.1. *Presentation Period*

Competitors have twenty (20) minutes to present the topic in detail, explained in terms that the public can understand. They must present the environmental, social, economic and political impacts, and whether these impacts are positive or negative. Competitors must give a critical discussion of the technology and associated issues.

3.9.2.2. *Question Period*

The judges then have a maximum of ten (10) minutes to ask questions. If time permits, the audience may also be allowed to ask questions.

3.9.3. Timekeeping

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

- The time must be stopped when a judge asks questions during the presentation period
- The time must be stopped while a team member responds to a question asked by a judge during the presentation period
- The remaining time must be indicated to the competitor(s): twenty (20) minutes, ten (10) minutes, five (5) minutes, and one (1) minute before the end of the presentation
- A visual countdown must be given during the last thirty (30) seconds of the presentation
- Teams will be penalized five (5) points/minute for under-use of time greater than three (3) minutes
- Teams whose presentation exceed thirty (30) minutes in length will be given a fifteen (15) second grace period to finish their presentation. If their presentation is not completed after the fifteen (15) second grace period, the presentation will be terminated by the Competition Leads
- The timing of the question period after the presentation shall be for information purposes only

3.9.4. Presentation Order

- The order of the presentations 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

3.9.5. Deliverables

3.9.5.1. *Presentation Abstract*

Prior to the competition, the team must submit a presentation abstract. The purpose of this abstract is for the judges and organizers to be prepared. The abstract must be a maximum of two hundred (200) words describing the presentation topic. It must also state the competitor's name(s), and Team Name.

3.9.5.2. *Presentation Slides*



Competitors must supply a soft copy of their presentation to the Competition Director at least seven (7) days prior to the day of the competition. The Competition Leads may assign the due date at their discretion to allow time for testing the presentation and printing hardcopies. These slides will be used to aid the judges in keeping notes and providing feedback when necessary and desired.

3.10. Assessment and Judging

- Judges should have experience in communications
- Judges do not require any technical knowledge on the topics being presented
- The panel must have an odd number of judges with a minimum of 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 OEC

3.10.1. Judging Matrix

Introduction to Topic	Topic and Background Clearly Presented Appropriate Level of Language Interest Elicited by Topic Accuracy of Explanation	/25
Critical Analysis	Environmental, Social and Economic Analysis Quality of Arguments	/30
Presentation	Voice Articulation and Timing Visual Aids Response to Questions	/40
Written Abstract		/5
Penalties	Plagiarism	-50
	Insufficient Citation	-50
	Documents Received After Deadline	-50
	Absent Team Member	-25
	Verbal Disclosure of School During Presentation	-10
	Disclosure of School in Presentation Files/Documents	-10
	Disclosure of School by Supporting Audience Members	-10
Total		/100

3.10.2. Penalties

- For each grammar or spelling mistake in the abstract, one (1) point deduction
- For every third grammar or spelling mistake in the presentation (e.g. one (1) grammar mistake and two (2) spelling mistakes), one (1) point deduction
- For each day of late submission for the abstract, five (5) points deduction
- For presentations less than twenty-seven (27) minutes, five (5) points/minute deduction for every minute under twenty-seven (27) minutes (e.g. a twenty-five (25) minute presentation will result in a deduction of ten (10) points)



4. Parliamentary Debate

Parliamentary Debate Competitors must use analytical techniques to present, with minimum preparation, a reasoned point of view of a resolution that has not been disclosed beforehand. The goal is to assess the competitors' abilities to convey ideas and develop arguments. The purpose is not to assess competitor knowledge of parliamentary procedure and formal debating rules. Therefore, the rules normally used in debates have been modified and relaxed to enable students with no formal debate experience to take part. The debate will be conducted in a shortened Canadian National Style debate format.

4.1. Team Composition

A debate team must consist of two (2) members.

4.2. Language

A team may choose to debate in either English or French. Both members from the same team must debate in the same language for the entire round.

4.3. Resources

4.3.1. Facilities Required

- Two (2) amphitheaters
- Two (2) rooms for judge's deliberation
- Rooms for debater's preparation

4.3.2. Personnel Required

4.3.2.1. Judges

A minimum of three (3) judges (and in any excess, an odd number of judges) per room are required to assess the problem-solving abilities, proposed solution, communication skills and team dynamics of the competitors. Judges in this category should come from a variety of backgrounds. It is not necessary for judges to have technical experience relating to the topic, but it is suggested that judges have knowledge and/or experience in debating.

4.3.2.2. Competition Lead

The Competition Lead and VP Competitions are responsible for the entire implementation of the Debate competition. The Competition Lead must work with the Moderator in developing the debate topics, schedule and overall competition procedure. It is recommended that the Competition Lead have previous experience in debates, preferably at the OEC or internal qualifier.



4.3.2.3. *Debate Moderator/Debate Chair*

The Debate Moderator, otherwise known as a Debate Chair, is the expert in debate procedure and interpretation. The Moderator acts as an impartial judge and ensures that the judges understand the rules of the debate.

The Chair of the debate ensures the rules of the debate are upheld. They grant the right to speak (introduces the debater) and enforce the time limits. Most importantly, the Chair makes rulings on the “points of procedure” put forward by the debaters. The decisions of the Chair are final.

4.3.2.4. *Timekeeper*

The Timekeeper is responsible for ensuring that competitors stay within their allotted time limits. The timekeeper will inform speakers of specific time intervals. The Timekeeper will use hand signals to indicate the number of minutes a speaker has left to conclude their argument. The first and last thirty (30) seconds of a speech will be marked by the Timekeeper banging on the table, with the first bang indicating that Points of Information (POIs) are now permitted and the second bang indicating that POIs are no longer permitted. The Timekeeper will also give a ten (10) seconds final countdown on their hands. If a question is asked in the first or last minute of the speech, the Timekeeper will indicate this to the Chair so that it can be stopped. If a member of the debater team knocks on the table during the final ten (10) seconds, the Timekeeper will permit an extra and final fifteen (15) seconds of grace.

4.3.3. *Equipment Provided by OEC*

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

- One (1) display board, projector, chalkboard or whiteboard is required to display the debate topic during the debate
- One (1) to three (3) stopwatches (a stopwatch for each speaking team is optional but encouraged)
- Two (2) tables
- One (1) podium with microphone
- One (1) microphone for each team table and one (1) for judging table, for a total of three (3) microphones

The layout of the room should place the tables and podium at the front of the room. The first row of the room will be reserved for the judges, Moderator, and Timekeeper. During preparation prior to each debate, the Government team will prepare in the room, while the Opposition team will prepare in the hallway located outside the room.

4.3.4. *Allowed External Resources*

External resources such as stopwatches, writing pads and other tools are allowed at the discretion of the Moderator and judges. Props and any other external resources except those expressly mentioned previously are prohibited.



4.4. Debating Rules and Elements

4.4.1. Teams

The debate is between two teams, each with two members. The government will be given the task of presenting an initial set of ideas and arguing their validity. The opposition will then proceed to show how these ideas are undesirable. Before the resolution is revealed, a coin toss is held. The team that wins the toss gets to pick the side that they want to represent. Teams are always expected to act responsibly. Inappropriate language or offensiveness towards the other team, the officials, or the audience is not acceptable. Teams are expected to direct all their speeches towards the Chair.

4.4.2. Resolutions

The resolutions will be assigned by the organizing committee and will be validated by the Debate Chairs before the competition begins. They will be related to an issue that the average engineering student should have a defensible opinion on without any preparation. The resolutions will not be truisms. Absolute words such as "all," "everyone," and "always" will also be avoided (e.g. "Be it resolved that all engineers are good at math" is not a good resolution, since there are always exceptions). Once both teams are informed of the resolution, they are given ten (10) minutes to prepare for the debate.

4.4.3. Time Allotted to Debaters

The speaking order and times will be as follows:

- First speaker of the government: five (5) minutes
- First speaker of the opposition: five (5) minutes
- Second speaker of the government: five (5) minutes
- Second speaker of the opposition: five (5) minutes
- Rebuttal by the first speaker of the opposition: two (2) minutes
- Rebuttal by the first speaker of the government: two (2) minutes

If a debater is over the time limit, the Chair will allow a fifteen (15) second grace period. Upon the exhaustion of speaking time, loud pounding on tables will be deemed appropriate.

4.4.4. Role of the Government

The government must narrow down the resolution so that the debate will be about one major topic. The resolutions must not be squirreled or converted into truisms. Squirreling is the act of redefining the resolution so that it has a meaning different than the one intended by the resolution. The government must also avoid specific knowledge debates where the average engineer has no familiarity with the topic. The government can follow one of two different strategies in the debate:



4.4.4.1. *The Principle Case (This House Believes That)*

In a principle case, the government presents a principle and a contention. The principle is a general statement that is debatable based on facts, experience, or morals. Examples include "Engineers need to be well rounded" and "Canadians abuse the free health-care system." The contention is the application of the principle to a situation relating to the resolution. The contention must be about one major topic and may be a restatement of the resolution. Example contentions for the above principles would be "Engineering students should be required to take more complementary studies classes" and "People should be discouraged from going to a doctor unless necessary."

4.4.4.2. *The Plan Case (This House Would)*

In a plan case, the government still identifies a principle and a contention. Once this is done, they present a plan for implementing the contention and changing the status quo. They must identify the need for change and how the plan will induce this change. Example plans for the above contentions would be "Students should be required to take two years of general studies before entering an engineering program" and "Individuals should be charged a fee every time they visit a doctor."

The plan case is the most effective when the principle and contention are almost non-debatable. For example, if the resolution is "Be it resolved that waste management should become more stringent," the contention is almost unquestionable. However, the proposition can intensify the debate by adding, "Thus, we propose that any household that produces more than a certain quota of waste be severely fined." In a plan case, it is important that the plan does not become too specific since preparation time is limited and the technical knowledge necessary to develop the plan is non-existent.

4.4.5. *The First Speaker*

The first speaker of the government must explain the interpretation of the resolution, clearly state the principle and contention, and clarify any definitions. If a plan case is introduced, the entire plan must be outlined in the first speaker's speech. Finally, the first speaker must initiate the argumentation for the contention and plan.

4.4.6. *The Second Speaker*

The second speaker of the government continues the argumentation of the first speaker and reaffirms concepts that have been attacked by the opposition. New parts of a plan may not be introduced and terms in the resolution may not be defined. New lines of argumentation and new evidence, however, may be introduced.

4.4.7. *Role of the Opposition*

The opposition's task is to convince the judges that the government's views are fallacious. If the case presented by the government is a truism or requires specific knowledge to debate, the opposition can point this out in their first speech and will be rewarded accordingly by the judges. If the point is well taken, then the opposition must redefine the resolution in a debatable manner. If the government presents a principle case, the opposition is left with



little more to do than attack the principle. If the government presents a plan case, the opposition can attack the principle, the contention or the arguments for the plan. The opposition can also show how the plan will not work or identify the undesirable side effects that it will create. Finally, the opposition may propose a counter plan that is more effective than the original plan. The first speaker of the opposition must introduce counter plans.

4.4.8. Rebuttals

In the rebuttals, the most prevalent elements of the debate must be summarized in a concise and convincing manner. Excluding the first rebuttal of the opposition, no new arguments or facts may be presented unless they directly refute what has already been discussed.

4.4.9. Questions (Points of Information)

Questions, also known as Points of Information or POIs, are a secondary means of refuting arguments. They can promptly point out deficiencies in ideas, put speakers on the spot and hog time. The debater who currently holds the floor has the authority to take or ignore questions. The opponent who wishes to ask a question indicates their desire by simply standing up and extending an arm forward. If the debater does not wish to take the question, he or she can indicate by a wave of the hand or a simple "no, thank you". If this occurs, the inquiring party must sit down. If the current debater wishes to entertain the question, it must be stated by the opponent in less than fifteen (15) seconds during which the speaker must yield the floor.

The debater who holds the floor, or their team member, may take part in answering the question. The time used to ask and answer the question comes out of the current debater's allotted time. Each debater must accept one question during his or her speech, if the opponent is making an honest attempt to ask questions. Three attempts at asking a question in one speech constitutes an honest attempt. Questions will not be allowed in the first or last thirty seconds of a speech, or during rebuttal speeches.

4.4.10. Heckling

Often, the speaker can contradict himself/herself or make an absurd assumption. Heckling at this time will point out the error and add to the debate. Heckling is acceptable if it is short, to the point and preferably witty. If excess heckling becomes disturbing, the Chair may intervene.

4.4.11. Points of Procedure

If a team believes that one of the rules of the debate have been broken, they must immediately alert the Chair of the violation by standing and saying, "Point of Procedure." The Chair will then respond with, "Make your point." The team will then proceed to explain how the debate rules have not been followed. Finally, the Chair will rule on the point by saying, "Point well taken" or "Point not taken." If it is obvious that the Chair is incorrect, the team should not argue with the Chair, but expect the judges to compensate for the Chair's shortcomings. The time it takes to rise and rule on a point is not included in the speaking time of the team currently debating. The following are violations that warrant a point of



procedure:

- Unprofessional behavior
- Offensive behavior
- Misquotations
- Speaking to the opposition instead of the audience
- Presenting new arguments in the rebuttal
- Introduction of parts of a plan by the second speaker

If the government has presented a truism or specific knowledge case, the opposition must wait until the end of the first debater's speech to point this out. Moreover, if the officials have failed to follow the rules of debate (incorrect speaking order, too much speaking time allowed, etc.), it may be politely pointed out to them with a Point of Procedure. Points of Procedures are commonly seen to detract from a debate when offered incorrectly. Points of Procedure which take away from the flow of a debate unnecessarily will be penalized by the judges.

4.5. Procedure / Timeline

4.5.1. Pre-Competition

At least seven (7) days before the competition, the Competition Lead will assign each team their designated Team Name for use at the competition. A competition briefing will occur before the commencement of the competition and will include information for the Debate Moderators/Chairs, Timekeeper, Competition Lead, VP Competitions, judges, and competitors including the schedule and format of the tournament. The purpose of the briefing is not to allude to potential debate topics, but to ensure that all rules and procedures are understood by judges and competitors. Any remaining questions will be answered afterwards.

4.5.2. Presentation Order

The debate schedule will be prepared at random and presented at the pre-competition briefing (at least thirty (30) minutes prior to the first debate). This schedule will remain visible and updated systematically throughout the competition. The schedule should also illustrate the path which a team will follow depending on wins and losses.

4.5.3. Double Elimination

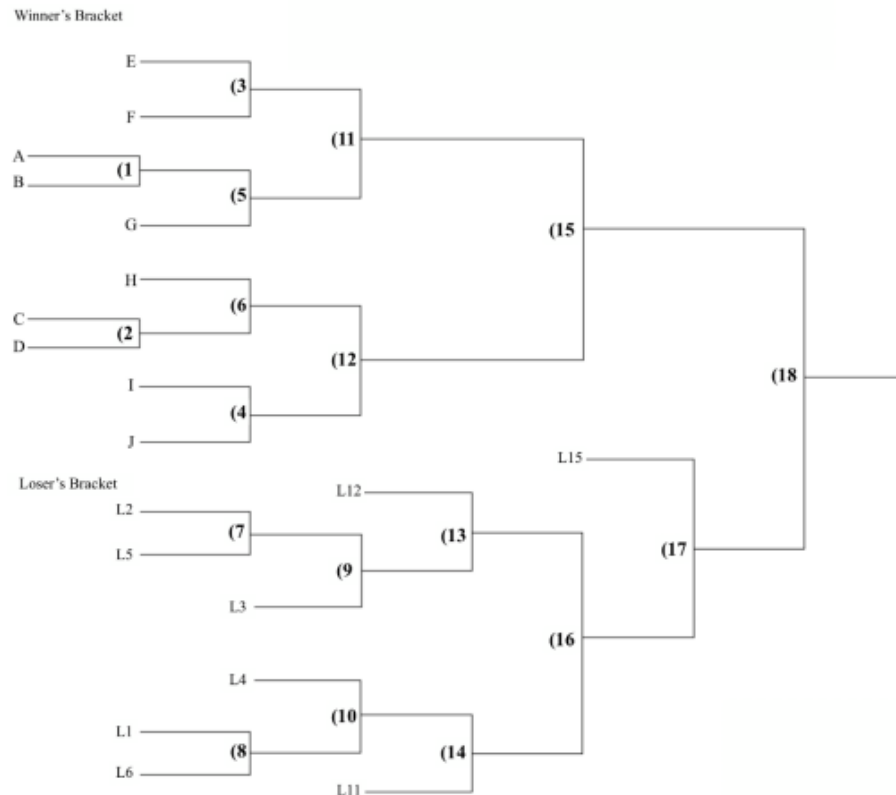
The debate competition will follow a double elimination format which ensures all teams will get to participate in at least two (2) debates. The competition begins with matches between randomly assigned pairs of teams. Once each team has debated once, the losers from the matches will face each other in a second "tree". (Note, in the case of an odd number of teams, all but one team will debate before the second tree commences.) The debates then proceed in the same format with the first tree being those teams that have not lost a match, and the second tree for those that have lost a single match. Once a team has lost two (2) matches, they are out of the competition. The final match is between the top teams from each tree, and the third-place team is the one with the most wins that didn't make it to the



final.

Teams may have to debate two (2) or more times in a row, due to the dynamic nature of the format, however the Debate Competition Lead should do their best to ensure teams are given reasonable breaks between debates. Double elimination is used to ensure a minimum level of team participation, therefore if a team proceeds unbeaten until the final round, only to lose to another team, there will not be an additional final debate.

Please refer to the graphic below for the sample bracket for a 10-team debate competition. Please note that this bracket is subject to change.



4.6. Assessment and Judging

4.6.1. Judging

The debate is judged based upon the most convincing argument communication skills, and ability to follow outlined procedures. Each judge will decide individually, and the debate chair will tally the decisions and announce the winner. The winning team will then move to the next round.

4.6.2. Feedback

Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC.



5. Innovative Design

The innovative design competition is prepared entirely outside the realm of the OEC. Competitors choose their own topic, prepare research and develop a design. The designs must be new and innovative and address a void in society.

5.1. Team Composition

The innovative design team may be comprised of one (1) to six (6) competitors. Should the presenting team be a subset of the project team, the remaining members of the project team must sign a letter authorizing the presentation of the project for it to be eligible for the competition.

5.2. Topic/Project Eligibility

The topic should adhere to the following criteria:

- The project must be technical in nature
- The project must have a design component
- The project must assess social, environmental and economic ramifications of implementation

While the above list provides a guideline to project selection, no projects will be disallowed due to the topic selection. The judging criteria provide a component which analyses the applicability of the project's topic.

5.3. Language

The design summary, presentation display, and presentation can be done in either English or French but must be consistent in language.

5.4. Resources

5.4.1. Facilities Required

- An exhibition hall is required to allow competitors to set up displays for the general public, and for the voting of the People's Choice Award. This hall should be in a central location and must be open to the public during the competition.
- One (1) amphitheater for formal judging presentations

5.4.2. Personnel Required

5.4.2.1. 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 should come from a variety of backgrounds including communications, sales, and technical or consulting



engineering experience related to the topic.

5.4.2.2. *Competition Lead*

The Competition Lead is responsible for the logistics and implementation of the Innovative Design competition. The Competition Lead must be available to competitors and judges at any time for questions and requests.

5.4.2.3. *Official Timekeeper*

The Official Timekeeper is typically the Competition Lead who enforces the time limits and the rules governing the displays.

5.4.3. Equipment Provided by OEC

The following equipment will be made available to all competitors during the public display period:

- A table to display presentation
- Electrical power supply for each team
- Internet source

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

- One (1) digital projector
- One (1) table
- Blackboard(s) or whiteboard(s)

5.4.4. Allowed External Resources

There is no restriction on the resources which competitors are allowed to bring to the competition. A list of resources must be provided to the Competition Lead in accordance with Section 5.5.1.

5.4.4.1. *Resource Request*

Prior to the competition, the team may submit a resource request. The purpose of this request is if teams require resources outside of those listed in Section 5.4.3. (Equipment Provided by OEC). The Competition Lead will review the requests and determine if the request is viable. Team will be informed early in the week before the competition is their request can be accommodated.

This request will follow conventional formatting characteristic (12-point form, 1.5 line spacing, 1" paper margins) and is limited to one (1) page. The request must include, but is not limit to:

- Team name
- Team members
- School and team A/B if applicable
- Reason for required resource



5.5. Procedure / Timeline

5.5.1. Pre-Competition

12 days prior to OEC	Announcement of Constraints <ul style="list-style-type: none"> Space constraints and other logistical constraints must be described to the competitors (maximum display dimensions, maximum display height, use of flammable or dangerous products prohibited, etc.). Location where all display material, models and equipment will be shipped to and stored must be announced.
7 days prior to OEC	Design Summary <ul style="list-style-type: none"> A one (1) page brief, detailed in Section 5.5.5 (Deliverables). Layout and Specific Needs <i>Competitors must convey the following information to the Competition Lead:</i> <ul style="list-style-type: none"> Any specific needs (layout, electrical, power supply, etc.) must be specified via Resource Request, detailed in section 5.4.4 (Allowed External Resources) A sketch of the anticipated layout, including placement of the display board and any equipment or models. The planned shipping modes of displays or equipment including arrival time.
During OEC	Public Display Set-up <ul style="list-style-type: none"> Competitors set up their displays the morning of the display. Compliance with the dimension constraints are checked at this time. Competition Briefing <ul style="list-style-type: none"> The Competition Lead will host a competition briefing, attended by the competitors and judges, where details of the competition timeline and judging structure are discussed. There will be time allowed for questions. At the briefing, each team will be asked for a copy of their presentation handouts, described in Section 5.5.5 (Deliverables).

5.5.2. Competition

5.5.2.1. Public Opening

The exhibitions are open for visits from the general public. Competitors must staff their displays for a minimum of two (2) hours. People’s Choice Award will be voted on during the Public Opening. A QR code for People’s Choice Award voting will be at each display.

5.5.2.2. Judging

The competitors must give a fifteen (15) minute presentation to the judges, followed by a five (5) minute question period, in a private room. They must use only the resources previously outlined to illustrate their work.

5.5.3. Timekeeping

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

- Time is not halted when a judge asks a question during the presentation
- The remaining time must be indicated to the competitors ten (10) minutes, five (5) minutes, and one (1) minute before the end of the allotted time for the presentation
- A visual countdown must be given during the last thirty (30) seconds of the presentation



- Presenters will be asked to stop their presentation if they exceed fifteen (15) minutes
- Time to both ask and answer questions during the question period is counted

5.5.4. 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

5.5.5. Deliverables

5.5.5.1. Design Summary

Prior to the competition, the team must submit a design summary. The purpose of this summary is for the judges and organizers to be prepared ahead of time with regard to the topics. This summary will follow conventional formatting characteristics (12-point font, 1.5 line spacing, 1" paper margins) and is limited to one (1) page. The summary must include, but is not limited to:

- Team Name
- Team Members
- Design topics and description

5.6. Assessment and Judging

- The panel must have an odd number of judges
- The panel must comprise a minimum of three (3) judges. There is no maximum number of judges
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC

5.6.1. Judging Matrix

Project	Design Justification	/70	
	Environmental, Social and Economic Feasibility		
	Technical Feasibility/Innovation		
Presentation	Voice	/20	
	Articulation and Timing		
	Visual Aids		
	Response to Questions		
Written Abstract		/10	
	Plagiarism		-50
	Insufficient Citation		-50
	Documents Received After Deadline		-50



Penalties	Absent Team Member	-25
	Verbal Disclosure of School During Presentation	-10
	Disclosure of School in Presentation Files/Documents	-10
	Disclosure of School by Supporting Audience Members	-10
Total		/100

5.6.2. Penalties

- For every minute the presentation exceeds the time limit, two (2) points deduction
- For each day of late submission, five (5) points deduction
- For every three (3) grammar or spelling mistake in the abstract, one (1) point deduction



6. Junior Design

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.

6.1. 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 OEC starts.

6.2. Language

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

6.3. Resources

6.3.1. 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)

6.3.2. Personnel Required

6.3.2.1. 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.

6.3.2.2. 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.



6.3.2.3. *Official Timekeeper*

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

6.3.3. Equipment Supplied by OEC

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

6.3.3.1. *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

6.3.3.2. *During the presentation*

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

Note: Since the use of the Internet and other external resources is permitted in this competition, all information used by competitors must be referenced very carefully. Competitors are not permitted to submit work completed by anyone other than the members of their team. If there is any evidence that competitors are submitting plagiarized work, the entire team will be eliminated from the competition and their home schools will be notified. Volunteers will monitor each team during the design process to deter teams from cheating, however, competitors are expected to act in good faith with the spirit of the competition.

6.3.4. 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.



6.4. Procedure / Timeline

6.4.1. Pre-Competition

At least seven (7) days before the competition, information about the rules of the competition will be sent to all competitors. The Competition Leads will assign each team their designated Team Name for use at the competition, and a detailed competition timeline will also be provided as well as any background information which may be deemed necessary by the Competition Leads.

6.4.2. Competition

6.4.2.1. *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.

6.4.2.2. *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.

6.4.2.3. *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.

6.4.2.4. *Rest Period*

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

6.4.2.5. *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.

6.4.3. Timekeeping

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



6.4.3.1. *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

6.4.3.2. *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

6.4.4. 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

6.4.5. Deliverables

6.4.5.1. *For Competitors*

Each competitor will receive, electronically, seven (7) days in advance of the competition, a package outlining the main themes of the competition and any materials and/or tools that will be provided to competitors during the competition. It is the competitor's responsibility to ensure that they have received the package. At the competition briefing, each team will receive a package outlining the problem definition, background information, design and presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Leads.

6.4.5.2. *From Competitors*

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.

6.4.6. 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

6.5. 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 OEC

6.5.1. Judging Matrix

Design Quality	Deliverable Compliance with Expectations	/50
	Technical Feasibility/Innovation	
	Use of Resources	
Presentation	Design Process	/20
	Design Justification	
	Design Critique	
	Voice	
	Articulation and Timing	
	Visual Aids	
	Response to Questions	
Testing		/30
Penalties	Plagiarism	-50
	Documents Received After Deadline	-50
	Absent Team Member	-25
	Verbal Disclosure of School During Presentation	-10
	Disclosure of School in Presentation Files/Documents	-10
	Disclosure of School by Supporting Audience Members	-10
Total		/100



6.5.2. Feasibility

Given that the intention of the competition is to create a practicable, realistic solution to the given problem statement, a penalty of fifty (50) points will be deducted from the final score of any team whose design is based fundamentally upon an impossible concept, and/or makes no realistic attempt to solve the design problem within the constraints of the problem statement.



7. Senior Design

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

7.1. Team Composition

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

7.2. Language

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

7.3. Resources

7.3.1. 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)

7.3.2. Personnel Required

7.3.2.1. 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 should have some technical engineering experience.

7.3.2.2. Competition Leads

The Competition Leads are responsible, along with the VP Competitions, for the design and implementation of the Senior Team Design 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.

7.3.2.3. Official Timekeeper

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



7.3.2.4. *Volunteers*

A minimum of five (5) volunteers (one volunteer for every two teams plus one extra) are recommended to carry out various support tasks during the design period. A minimum of two (2) volunteers are required during the presentation and testing phases. Volunteers will be supervising all rooms during the build time.

7.3.3. *Equipment Provided by OEC*

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

7.3.3.1. *During the design phase*

- A design room with at least one (1) table, four (4) chairs and a whiteboard or blackboard
- One (1) digital storage device to submit the team presentation (USB)
- Any materials and/or tools specific to the design problem

7.3.3.2. *During the presentation*

- One (1) digital projector
- One (1) computer to load presentations (using a personal computer is acceptable)
- One (1) table
- Whiteboard(s) or blackboard(s) or sheet paper

7.3.4. *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 Leads 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: Since the use of the Internet and other external resources is permitted in this competition, all information used by competitors must be referenced very carefully. Competitors are not permitted to submit work completed by anyone other than the members of their team. If there is any evidence that competitors are submitting plagiarized work, the entire team will be eliminated from the competition and their home schools will be notified. Volunteers will monitor each team during the design process to deter teams from



cheating, however, competitors are expected to act in good faith with the spirit of the competition.

7.4. Procedure / Timeline

7.4.1. Pre-Competition

At least seven (7) days prior to the competition, the main theme(s) dealt with during the competition will be announced to the competitors via their provided email addresses. Moreover, they will receive a list of all required, optional or prohibited equipment, software, and/or tools. The Competition Leads will assign each team their designated Team Name for use at the competition.

7.4.2. Competition

7.4.2.1. *Presentation of Problem*

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

7.4.2.2. *Question Period*

Competitors have fifteen (15) minutes to ask the Competition Leads any questions they may have. This takes place during the competition briefing, after the presentation of the problem. Only the time used to ask the questions should be counted, not the time used to answer the questions.

7.4.2.3. *Development of the Solution*

The teams will have eight (8) to ten (10) hours (at the discretion of the organizers, length to be given to competitors at least seven (7) 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.

7.4.2.4. *Rest Period*

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

7.4.2.5. *Presentation and Tests*

The presentation schedule will be posted exactly (30) minutes prior to 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 original design, its rationale, a description of the design process, and a critique of the prototype must be presented. The judges then have a maximum of ten (10) 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 director). The testing may be



carried out at the discretion of the Competition Leads.

7.4.3. Timekeeping

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

7.4.3.1. *During the design phase*

- Time is started when all the teams have reached their work areas during 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

7.4.3.2. *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 given 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 who are cut-off will be penalized

7.4.4. 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

7.4.5. Deliverables

7.4.5.1. *For Competitors*

Each competitor will receive, electronically, seven (7) days in advance of the competition, a package outlining the main themes of the competition and any materials and/or tools that will be provided to competitors during the competition. It is the competitor's responsibility to ensure that they have received the package. At the competition briefing, each team will receive a package outlining the problem definition, background information, design and presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Leads.

7.4.5.2. *From Competitors*

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.

7.4.6. 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

7.5. 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
- Competition Leads 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 OEC

7.5.1. Judging Matrix

Design Quality	Deliverable Compliance with Expectations Environmental, Social and Economic Consideration Technical Feasibility/Innovation Use of Resources	/20
Presentation	Design Process Design Justification Design Critique Voice Articulation and Timing Visual Aids Response to Questions	/40
Testing		/40
	Plagiarism	-50
	Insufficient Citation	-50
	Documents Received After Deadline	-50



Penalties	Absent Team Member	-25
	Verbal Disclosure of School During Presentation	-10
	Disclosure of School in Presentation Files/Documents	-10
	Disclosure of School by Supporting Audience Members	-10
Total		/100

7.5.2. Feasibility

Given that the intention of the competition is to create a practicable, realistic solution to the given problem statement, a penalty of fifty (50) points will be deducted from the final score of any team whose design is based fundamentally upon an impossible concept, and/or makes no realistic attempt to solve the design problem solved within the constraints of the problem statement.



8. Re-Engineering

Re-engineering is the act of taking an existing engineering concept, product, technique, or technology and incrementally improving on its design to suit an alternate situation or application. In this competition, students will be required to apply the re-engineering process to an existing gadget or mechanism in order to add new functionality to it or enhance its original functionality. The intent of these improvements will be to extend the use of the device to an alternative situation or use case.

8.1. Team Composition

The Re-Engineering team will be comprised of a maximum of two (2) competitors.

8.2. Topic

It is recommended that the topic incorporate more than one engineering discipline. However, while the topic should challenge competitors' technical knowledge and skills, it should also require competitors to evaluate the economic, environmental, political and social implications of their proposed solutions and address the requirements of the customer. The winning solution will not necessarily be the most technically effective solution, but the solution that has the most real-world applicability and forethought. Therefore, the topic should be one that could exist in the real world. Topics drawn from reality must be fully documented. All necessary documentation must be provided to the competitors when the problem is presented.

8.3. Language

The presentation and report can be done in either English or French. The presentations and report must be consistent in language.

8.4. Resources

8.4.1. Facilities Required

- One (1) amphitheater (presentation of problem and team presentations)
- One (1) workroom per team (design of solution)

8.4.2. Personnel Required

8.4.2.1. 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 should come from a variety of backgrounds including communications, sales and technical or consulting engineering experience related to the topic.



8.4.2.2. *Competition Leads*

The Competition Leads are responsible, along with the VP Competitions, for the design and implementation of the Re-engineering competition. The Competition Leads must present the problem at the beginning of the competition and answer any questions raised by competitors. 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.

8.4.2.3. *Official Timekeeper*

The Official Timekeeper must be responsible for enforcing time limits during the question period, solution development and presentations, as stated in the rules.

8.4.3. Equipment Provided by OEC

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

8.4.3.1. *During the design phase*

- A design room with at least one (1) table, two (2) chairs and a whiteboard or blackboard
- One (1) digital storage device to submit the team presentation (USB)
- Internet connectivity
- Some information relevant to the design problem, at the discretion of the Competition Leads

8.4.3.2. *During the presentation*

- One (1) digital projector
- One (1) computer containing the team's presentation file
- Whiteboard(s) or blackboard(s)

8.4.4. Allowed External Resources

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

- Any background research conducted by team members prior to the competition
- Any electronic material stored on CDs, USB keys, disks or other storage devices
 - Please check with the organizers to make sure the format of your electronic information will be accessible using the computers provided by OEC
- Any textbooks, course notes or other reference material
- Each team member is allowed one computer

Note: Since the use of the Internet and other external resources is permitted in this competition, all information used by competitors must be referenced very carefully. Competitors are not permitted to submit work completed by anyone other than the members of their team. If there is any evidence that competitors are submitting plagiarized work, the entire team will be eliminated from the competition and their home schools will be



notified. Volunteers will monitor each team during the design process to deter teams from cheating, however, competitors are expected to act in good faith with the spirit of the competition.

8.5. Procedure / Timeline

8.5.1. Case Structure

The competition will consist of two (2) sets of written cases that will prompt the competitors to apply the re-engineering process and propose a solution. The first case will be sent to the competitors seven (7) days in advance of the competition start time. Competitors will be required to propose a solution for the first case, using as much of the advance time as they feel necessary, by the end of the competition design time. The second case set will be distributed at the beginning of the competition design time and its solution will also be required by the end of the competition design time. It is recommended for competitors to finish the solution to the first case prior to the competition.

8.5.2. Pre-Competition

At least seven (7) days prior to the competition, the main theme(s) of the competition will be announced to the competitors, judges and public. The first case set will be distributed to the competitors seven (7) days in advance of the competition start time and assigned Team Names and exact specifications of equipment available to teams during the competition (computers storage devices, available programs, etc.) will also be announced at this time.

8.5.3. Competition

8.5.3.1. *Presentation of Problem*

The first case set will be distributed to the competitors seven (7) days in advance of the competition start time. The second case set will be presented to the competitors on the competition start day but in advance of the competition start time. The lead time for this distribution will be sufficient to allow for the reading of case set and to allow for questions to be addressed but should not exceed one (1) hour. Competitors will not be permitted to start working towards a solution during the lead time period.

8.5.3.2. *Question Period*

Competitors then have fifteen (15) minutes to ask the Competition Leads any questions. Only the time used to ask the questions (not the answers) should be counted in the fifteen (15) minutes. Time used by judges to pose questions will not be counted.

8.5.3.3. *Solution Development*

Teams will be given four (4) to eight (8) hours (at the discretion of the organizers, length to be given to competitors at least seven (7) days in advance) to develop their solutions, produce all required deliverables, and prepare their presentations. All deliverables shall be submitted to the competition director before the end of the allotted time. Competitors



may finish before the end of the allotted time.

8.5.3.4. *Rest Period*

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

8.5.3.5. *Solution Presentations*

The presentation should cover both completed cases and should present both the material included in the reports and any additional information and explanations required in order to meet the evaluation criteria below. Competitors will have a maximum of fifteen (15) minutes to present their solutions. All team members must be present and participate in the presentation or be penalized by the judges. Judges then have a maximum of seven (7) minutes to ask questions. Judges can ask a question at any time during the presentation. The clock must be stopped during these interruptions. In order to ensure that all competitors cease to work on the case solutions once the design time has ended, the competitors cannot include any material in their oral presentation which is not included within their submitted written reports or presentation materials.

8.5.4. Timekeeping

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

8.5.4.1. *During the design phase*

- Time is started when the teams leave the competition briefing
- 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

8.5.4.2. *During the presentation*

- Time is halted when a judge asks a question during the presentation
- Time is halted when a team member answers a question asked by a judge
- The remaining time must be indicated to the competitors ten (10) minutes, five (5) minutes and one (1) minute before the end of the allotted time for the presentation to the judges
- A countdown presentation that is visible to both the judges and presenters must be given during the last thirty (30) seconds of the presentation

8.5.5. 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

8.5.6. Deliverables

8.5.6.1. For Competitors

Each competitor will electronically be given access to a package outlining the main themes of the competition and the seven (7) days in advance of the competition. This theme will also be posted on the official OEC website. The first case set will be distributed to the competitors 7 (7) days in advance of the competition start time, along with design requirements and rules. It is the competitor's responsibility to ensure that they have received the package. At the competition briefing, each team will receive a package outlining the second case, design and presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Leads.

8.5.6.2. From Competitors

Each team is required to submit, electronically, before the end of the design period, a report of no greater than one (1) page per case (not including appendices) detailing their proposed solution. The competitors may elect to shorten one of the reports and use the remaining space for their other report provided both reports are written end-to-end in a single document and the document does not exceed two single-sided pages. Competitors may also opt to combine both solutions into one report of the combined length if they feel this format better conveys their solutions. The report will be made available to the judges before each team's presentation. The report requirements will be outlined in the problem design package. Each team is required to submit, electronically, before the end of the design period, a presentation about their proposed solution(s). The requirements of the presentation will be outlined in the problem design package.

8.5.7. Response for 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.
- During the week prior to the competition start time, all questions regarding the first case must be answered with forty-eight (48) hours.



8.6. Assessment and Judging

- The panel must have an odd number of judges
- The panel must have at least three (3) judges
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC

8.6.1. Judging Matrix

		Case 1	Case 2
Solution	Functionality of Proposed Changes	/40	/20
	Environmental, Social and Economic Feasibility		
	Technical Feasibility		
	Real-world Applicability		
Report	Clarity	/15	
	Writing Style and Professionalism		
	Deliverable Compliance with Expectations		
Presentation	Voice	/25	
	Articulation and Timing		
	Visual Aids		
	Response to Questions		
Penalties	Plagiarism		-50
	Insufficient Citation		-50
	Documents Received After Deadline		-50
	Absent Team Member		-50
	Verbal Disclosure of School During Presentation		-25
	Disclosure of School in Presentation Files/Documents		-10
	Disclosure of School by Supporting Audience Members		-10
Total			/100



9. Programming

The goal of the programming category is to encourage engineering students to produce a piece of readable software. The teams will use their software development skills, their technical writing abilities, and their project management skills to design a solution to a posed problem. This solution will then be presented to company executives (judging panel) for approval. The winning solution will not necessarily be the most technically correct but the one that has the most real-world application and is most thoroughly thought out.

9.1. Team Composition

The Programming team will be comprised of a maximum of four (4) competitors.

9.2. Language

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

9.3. Topic

The topic will be a real-life problem found in any professional industry which can be solved through the application of programming. The type of industries can include, but are not limited to, finance, health, transportation, manufacturing and construction. Although not completely needed, a team that is formed of students from more than one engineering discipline is advised, as it would help to develop a complete solution.

9.4. Resources

9.4.1. Facilities Required

- One (1) amphitheater (presentation of problem and team presentations)
- One (1) workroom per team (design of solution)

9.4.2. Personnel Required

9.4.2.1. 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 should come from a variety of backgrounds including communications, sales and technical or software engineering experience related to the topic.



9.4.2.2. *Competition Leads*

The Competition Leads are responsible, along with the VP Competitions, for the design and implementation of the Programming competition. The Competition Leads must present the design problem at the beginning of the competition and answer any questions raised by competitors. 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.

9.4.2.3. *Timekeeper*

The Official Timekeeper must be responsible for enforcing time limits during the question period, solution development and presentations, as stated in the rules.

9.4.3. Equipment Provided By OEC

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

9.4.3.1. *During the design phase*

- A design room with at least one (1) table, four (4) chairs and a whiteboard or blackboard
- Internet connectivity
- Information relevant to the design problem, at the discretion of the Competition Leads

9.4.3.2. *During the presentation*

- One (1) digital projector
- One (1) computer containing the team's presentation file
- Whiteboard(s) or blackboard(s)

9.4.4. External Resources Allowed

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

- Any background research conducted by team members prior to the competition
- Any electronic material stored on CDs, USB keys, disks or other storage devices
 - Please check with the competition director to make sure the format of your electronic information will be accessible using the computers provided by OEC
- Any textbooks, course notes or other reference material
- Each team member is allowed one computer

9.4.5. Software resources

It is expected that the teams participating in this competition have adequate knowledge in choosing the best tools to solve the given problem. It is up to regional and provincial competition to restrict the tools allowed if they so desire.



Note: Since the use of the Internet and other external resources is permitted in this competition, all information used by competitors must be referenced very carefully. Competitors are not permitted to submit work completed by anyone other than the members of their team. If they decide to recycle their own or someone else's code it must be clearly cited in the presentation. In addition, the competitors also need to clearly explain why and where the recycled code was used in their software. The judges hold the right to ask any team member to describe what a particular section of the code does at any given point during the presentation. If there is any evidence that competitors are submitting plagiarized work, the entire team will be eliminated from the competition and their home schools will be notified. Volunteers will monitor each team during the design process to deter teams from cheating and to remind them to cite external resources. However, competitors are expected to act in good faith with the spirit of the competition.

9.5. Procedure/Timeline

9.5.1. Pre-Competition

At least seven (7) days prior to the competition, the main theme(s) of the competition will be announced to the competitors, judges and public. The Competition Leads will assign each team their designated Team Name for use at the competition, and exact specifications of equipment available to teams during the competition (computers storage devices, available programs, etc.) will also be announced at this time.

9.5.2. Competition

9.5.2.1. *Problem presentation*

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

9.5.2.2. *Question period*

Competitors then have fifteen (15) minutes to ask the competition director any questions. Only the time used to ask the questions (not the answers) should be counted in the fifteen (15) minutes. Time used by judges to pose questions will not be counted.

9.5.2.3. *Solution development*

Teams will be given six (6) to eight (8) hours (at the discretion of the organizers, length to be given to competitors at least seven (7) days in advance) to develop their solutions, produce all required deliverables, and prepare their presentations. All deliverables shall be submitted prior to the end of the provided time.

9.5.2.4. *Rest period*

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

9.5.2.5. *Solution Presentations*



Competitors will have a maximum of twenty (20) minutes to present their solutions. All team members must be present and participate in the presentation or be penalized by the judges. Judges then have a maximum of ten (10) minutes to ask questions. Judges can ask a question at any time during the presentation. The clock must be stopped during these interruptions. In order to ensure that all competitors cease to work on the case solutions once the design time has ended, the competitors cannot include any material in their oral presentation which is not included within their submitted written reports or presentation materials.

9.5.3. Timekeeping

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

9.5.3.1. *During the design phase*

- Time is started when the teams arrive at their respective workstations
- The time remaining in the competition must be announced three (3) hours, one (1) hour, thirty (30) minutes and ten (10) minutes before the deadline

9.5.3.2. *During the presentation*

- Time is halted when a judge asks a question during the presentation
- Time is halted when a team member answers a question asked by a judge
- The remaining time must be indicated to the competitors ten (10) minutes, five (5) minutes, and one (1) minute before the end of the allotted time for the presentation to the judges
- A countdown presentation that is visible to both the judges and presenters must be given during the last thirty (30) seconds of the presentation

9.5.4. 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 offense



9.5.5. Deliverables

9.5.5.1. *For competitors*

Each team member will electronically be given access to a package outlining the main themes of the competition seven (7) days in advance of the competition.

This theme will also be posted on the official OEC website. It is the competitor's responsibility to ensure that they have received the package.

At the competition briefing, each team will receive: a link to an online repository (e.g. hosted on Github, Bitbucket, or Gitlab) that will contain a package describing the problem definition, the design and presentation requirements, the rules, marking scheme and any other information deemed necessary by the Competition Leads. Team members only have the right to download/clone the repository on their personal laptop; they are not allowed to add a branch to the repository.

At the competition briefing, each team will also receive a package outlining the problem definition, design and presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Leads.

9.5.5.2. *From competitors*

Each team is required to submit, electronically, before the end of the design period all deliverables outlined by the problem. This must include the code which will be used to evaluate the team's solution and their presentation. Only the code provided to the Competition Leads will be used for evaluation.

9.5.6. 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 Lead 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



9.6. Assessment and Judging

- The panel must have an odd number of judges
- The panel must have at least three (3) judges
- The presentations shall be carried out without an audience
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC

9.6.1. Judging Matrix

Strategy/Algorithm	Simplicity Ingenuity Ability to Achieve Desired Outcome	/40
Code	Structure Readability Efficiency	/30
Resource Management	Memory Usage Efficiency Program's CPU Usage	/10
Presentation	Design Process Design Justification Design Critique Voice Articulation and Timing Visual Aids Response to Questions	/20
Penalties	Plagiarism Insufficient Citation Documents Received After Deadline Absent Team Member Verbal Disclosure of School During Presentation Disclosure of School in Presentation Files/Documents Disclosure of School by Supporting Audience Members	-50 -50 -50 -25 -10 -10 -10
Total		/100



10. Bio-Engineering

In this competition, teams comprehensively solve a bio-engineering problem. Teams are required to identify the issues outlined in the prompt and develop a bio-engineering design process in order to solve the issue in question.

10.1. Team Composition

The Bio-Engineering team will be comprised of a maximum of two (2) competitors.

10.2. Language

The presentation and report can be done in either English or French. The presentations and report must be consistent in language.

10.3. Topic

It is recommended that the topic incorporate more than one engineering discipline. However, while the topic should challenge competitors' technical knowledge and skills, it should also require competitors to evaluate the economic, environmental, political and social implications of their proposed solutions and address the requirements of the customer. The winning solution will not necessarily be the most technically effective solution, but the solution that has the most real-world applicability and forethought. Therefore, the topic should be one that could exist in the real world. Topics drawn from reality must be fully documented. All necessary documentation must be provided to the competitors when the problem is presented.

10.4. Resources

10.4.1. Facilities Required

- One (1) amphitheater (presentation of problem and team presentations)
- One (1) workroom per team (design of solution)

10.4.2. Personnel Required

10.4.2.1. 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 should come from a variety of backgrounds including communications, sales and technical or consulting engineering experience related to the topic.

10.4.2.2. Competition Leads

The Competition Leads are responsible, along with the VP Competitions, for the design and implementation of the Bio-engineering competition. The Competition Leads must present the problem at the beginning of the competition and answer any questions raised by competitors. 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.

10.4.2.3. *Official Timekeeper*

The Official Timekeeper must be responsible for enforcing time limits during the question period, solution development and presentations, as stated in the rules.

10.4.3. Equipment Provided by OEC

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

10.4.3.1. *During the design phase*

- A design room with at least one (1) table, two (2) chairs and a whiteboard or blackboard
- Paper and pencils/pens for writing
- One (1) digital storage device to submit the team presentation (USB)
- Internet connectivity
- Some information relevant to the design problem, at the discretion of the Competition Leads

10.4.3.2. *During the presentation*

- One (1) digital projector
- One (1) computer containing the team's presentation file
- Whiteboard(s) or blackboard(s)

10.4.4. External Resources Allowed

The competitors can bring the following equipment with them:

- Any background research conducted by team members prior to the competition
- Any electronic material stored on CDs, USB keys, disks or other storage devices
- Please check with the organizers to make sure the format of your electronic information will be accessible using the computers provided by OEC
- Any textbooks, course notes or other reference material
- Each team member is allowed one computer

Note: Since the use of the Internet and other external resources is permitted in this competition, all information used by competitors must be referenced carefully. Competitors are not permitted to submit work completed by anyone other than the members of their team. If there is any evidence that competitors are submitting plagiarized work, the entire team will be eliminated from the competition and their home schools will be notified. Volunteers will monitor each team during the design process to deter teams from cheating, however, competitors are expected to act in good faith with the spirit of the competition.

10.5. Procedure / Timeline

10.5.1. Case Structure



The competition will consist of one (1) written case that will prompt the competitors to apply the bio-engineering process and propose a solution. The case will be distributed at the beginning of the competition design time and its solution will also be required by the end of the competition design time.

10.5.2. Pre-Competition

At least seven (7) days prior to the competition, the main theme(s) of the competition will be announced to the competitors, judges and public. The assigned Team Names and exact specifications of equipment available to teams during the competition (computers storage devices, available programs, etc.) will also be announced one week in advance.

10.5.3. Competition

10.5.3.1. *Presentation of Problem*

The case will be presented to the competitors at the beginning of the briefing competition period. The lead time for this distribution will be enough to allow for the reading of the case and to allow for questions to be addressed but should not exceed one (1) hour. Competitors will not be permitted to start working towards a solution during the lead time period.

10.5.3.2. *Question Period*

Competitors have fifteen (15) minutes to ask the Competition Leads any questions. Only the time used to ask the questions (not the answers) should be counted in the fifteen (15) minutes. Time used by judges to pose questions will not be counted.

10.5.3.3. *Solution Development*

Teams will be given four (4) to eight (8) hours (at the discretion of the organizers, length to be given to competitors at least seven days in advance) to develop their solutions to the second case, produce all required deliverables, and prepare their presentations. All deliverables shall be submitted to the Competition Lead before the end of the allotted time. Competitors may finish before the end of the allotted time.

10.5.3.4. *Rest Period*

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

10.5.3.5. *Solution Presentations*

The presentation should cover both completed cases and should present both the material included in the reports and any additional information and explanations required in order to meet the evaluation criteria below.



Competitors will have a maximum of fifteen (15) minutes to present their solutions. All team members must be present and participate in the presentation or be penalized by the judges. Judges then have a maximum of ten (10) minutes to ask questions. Judges can ask a question at any time during the presentation. The clock must be stopped during these interruptions. In order to ensure that all competitors cease to work on the case solutions once the design time has ended, the competitors cannot include any material in their oral presentation which is not included within their submitted written reports or presentation materials.

10.5.4. Timekeeping

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

10.5.4.1. *During the design phase*

- Time is started when the teams leave the competition briefing
- 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

10.5.4.2. *During the presentation*

- Time is halted when a judge asks a question during the presentation
- Time is halted when a team member answers a question asked by a judge
- The remaining time must be indicated to the competitors ten (10) minutes, five (5) minutes and one (1) minute before the end of the allotted time for the presentation to the judges
- A countdown presentation that is visible to both the judges and presenters must be given during the last thirty (30) seconds of the presentation

10.5.5. 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

10.5.6. Deliverables

10.5.6.1. *For Competitors*

Each competitor will electronically be given access to a package outlining the main themes of the competition and the seven (7) days in advance of the competition. This theme will also be posted on the official OEC website. At the competition briefing, each team will receive a package outlining the design, presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Leads.



10.5.6.2. From Competitors

Each team is required to submit, electronically, before the end of the design period, a report of less than ten (10) pages (excluding appendices) is recommended detailing their proposed solution. The report will be made available to the judges before each team’s presentation. The report requirements will be outlined in the problem design package. Each team is required to submit, electronically, before the end of the design period, a presentation about their proposed solution(s). The requirements of the presentation will be outlined in the problem design package.

10.5.7. 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

10.6. Assessment and Judging

- The panel must have an odd number of judges
- The panel must have at least three (3) judges
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC

10.6.1. Judging Matrix

Solution	Deliverable Compliance with Expectations Environmental, Biomedical and Economic Consideration Technical Feasibility/Innovation Real-world Applicability	/60
Report	Clarity Writing Style Professionalism Design Justification	/15
Presentation	Voice Articulation and Timing Visual Aids Response to Questions	/25
	Plagiarism	-50
	Insufficient Citation	-50



Penalties	Documents Received After Deadline	-50
	Absent Team Member	-25
	Verbal Disclosure of School During Presentation	-10
	Disclosure of School in Presentation Files/Documents	-10
	Disclosure of School by Supporting Audience Members	-10
Total		/100



Revision Notes

The official rulebook for the OEC 2024 has seen some changes with emphasis on compliance with the Canadian Engineering Competition (CEC) and consistency with general competition rules. Differences between the OEC 2023 and OEC 2022 rulebook not directly addressed below are based upon feasibility of the competition, clarity, or compliance with the CEC 2020 rulebook.