



42nd **ONTARIO**
ENGINEERING COMPETITION
Official Rulebook

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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 comprising an undergraduate engineering competition outlined in this document.

1.1.3.

“Internal Qualifier(s)” refers to the competitions held by ESSCO member schools that 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 that oversees and organizes the competition.

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 Directors and all overarching responsibilities related to the competitions.

1.1.8.

“Director” or “Competition Director” refers to the role responsible for the specific competition within a competition section of the rulebook. The Competition Director is appointed or chosen by a process set forth by the Chairs. The Competition Directors 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

The VP Competitions or 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 this 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 an 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 case 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 Competitions 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.

1.4.3.

Competitors can only be enrolled in one category.

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, and Senior Design, 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 Director, 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 Director, 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 the 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 consist of the whole original team as it competed at its respective regional competition. If a competitor is unable to attend the competition due to medical, personal, or other legitimate reasons, the team may compete in their absence as a reduced team or may find a suitable replacement.

1.6.1.1

Substitute competitors must have competed in the same internal qualifying competition and meet all eligibility criteria as outlined in this document.

1.6.1.2

Substitute competitors must not exceed 50% of the original composition of the qualifying team.

1.6.1.3

If a team is unable to meet the criteria in this document, the second or third-place team from the same internal competition may be invited to attend OEC if they fit the criteria outlined in this document.

1.7. Regulation Amendments

These general regulations shall be considered the official regulations of the Ontario Engineering Competition (OEC), 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 (OECAB).

1.8. Violation of Competition Rules

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
- Clarification to a rule provided by a Competition Director during the question period

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

1.8.1 Procedure

1. The Competition Director will determine if the competitor(s) are in violation of the rules.
 - a. 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.
 - i. Competitors will be provided in writing the alleged violation of the rules following the design phase.
 - ii. This communication of a rule violation shall be reported to the team by the Competition Director (or an acting representative) to ensure the competitor(s) are immediately made aware of the situation.
 - b. 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 Director's 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.
 - c. If the competitors are not found to be in violation of any rules then the competition will continue as normal.
2. The RVC shall comprise the Vice President of Competitions and 3 other executive members. (One executive member will act as the non-voting chair.)
 - a. It is preferred that the chair(s) of the Ontario Engineering Competition is/are among the voting members of the RVC.
 - b. The RVC will have one (1) hour to review the appeal and vote to dismiss or hold the Competition Director's decision.
 - c. Competitor(s) will be immediately notified of the RVC decision.
 - i. The decision of the RVC is final, and not subject to appeals.

3. In the event of the discovery of a rule violation following the competition, competitor(s) will be immediately notified and have 1 hour to appeal and follow the procedure outlined in step 2.

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. In the case of Innovative Design, this rule does not apply.

1.9.2.

Presenters and debaters are also forbidden from wearing any apparel bearing the name, crest, colours, 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: GUELPH_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 and it is implied that all presentations, projects, and communication will be done in English. However, the OEC recognizes that competitors may choose to compete in French.

1.10.2 Translation

At the time of registration, competitors must notify the Organizing Committee that they 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 competitors.

1.11. Competition Delivery

1.11.1 Platform

The competition should be held in a physical location, with all of the events happening in-person. Many of the rules reflect this change. Given a situation where such an event cannot be held in-person, the Organizing Committee may deliver the competition through whichever online platforms deemed appropriate.

1.11.2 Competition Changes

In the event certain rules within a given competition are deemed not feasible, or certain resources to be provided are determined to be unreasonable by the Organizing Committee, the Organizing Committee can choose to forego these rules or resources, and provide an alternative if necessary. This alternative solution must be communicated through the problem statements for the competition(s) and be updated in the rulebook if it is a major amendment.

1.11.3 Resources Provided

In the event of the OEC being held online, the 'Facilities Required' and 'Equipment Provided by OEC' sections under each individual competition of this rulebook may not apply.

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 consist of a maximum of four (4) competitors.

2.2. Topic

It is recommended that the topic incorporates 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. Resources

2.3.1. Facilities Required

- An online chat platform for communicating questions and answers between the competitors and Competition Director
- Access to an online teleconferencing software for competitors to present their deliverables

2.3.2. Personnel Required

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

2.3.2.2. Competition Director

The Competition Director is responsible, along with the VP Competitions, for the design and implementation of the Consulting Engineering competition. The Competition Director must present the design problem at the beginning of the competition and answer any questions raised by competitors. Only the Competition Director may answer questions during the design period. The Competition Director will also answer any questions the judges may have during the competition.

2.3.2.3. 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.

2.3.3. Equipment Provided by OEC

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

2.3.3.1. During the design phase

- An online chat platform for communicating questions and answers between the competitors and Competition Director
- A method to submit the team presentation
- Information relevant to the design problem, at the discretion of the Competition Director

2.3.3.2. During the presentation

- Access to an online teleconferencing software for competitors to present their deliverables with screen sharing and other necessary functionalities
- Up to one (1) computer containing the team's presentation file

2.3.4. Allowed External Resources

The competitors may bring any external resources that they desire, given that they are able to transport them without assistance from any OEC volunteers.

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.

2.4. Procedure / Timeline

2.4.1. 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.

2.4.2. Competition

2.4.2.1. Presentation of Problem

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

2.4.2.2. 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.

2.4.2.3. 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.

2.4.2.4. Rest Period

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

2.4.2.5. 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.

2.4.3. Timekeeping

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

2.4.3.1. During the design phase

- Time is started with the declared end of 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

2.4.3.2. 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

2.4.4. Presentation Order

- The presentation order shall be determined randomly
- The presentation order shall be announced thirty (30) minutes before the presentations commence. All teams are required to be present at this announcement
- Teams are not allowed to switch places in the presentation order

2.4.5. Deliverables

2.4.5.1. *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 Director.

2.4.5.2. *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.

2.4.6. Response to Questions

- Only the Competition Director 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 Director 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

2.5. Assessment and Judging

- The panel must have an odd number of judges
- The panel must have at least three (3) judges

2.5.1. 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 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

2.5.2. Penalties

Note that there may be additional penalties according to the competition-specific problem statement. All penalties will be provided in the grading rubric of the competition package.

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.

3.1. Team Composition

The Communications Design team will consist 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 the presentation of the project for it to be eligible for the competition. This letter must be submitted with the competition abstract if applicable.

3.2. Topic Eligibility

The topic should fulfill the following criteria:

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

3.3. Resources

3.3.1. Facilities Required

- Access to online teleconferencing software for competitors to present their deliverables

3.3.2. Personnel Required

3.3.2.1. 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.

3.3.2.2. Competition Director

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

3.3.2.3. Official Timekeeper

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

3.3.3. Equipment Provided by OEC

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

- Access to an online teleconferencing software for competitors to present their deliverables with screen sharing and other necessary functionality
- Up to one (1) computer containing the team's presentation file

3.3.4. Allowed External Resources

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

3.3.4.1 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 3.3.3 (Equipment Provided by OEC). The Competition Director will review the requests and determine if the request is viable. Team will be informed early in the week before the competition if their request can be accommodated.

This request will follow conventional formatting characteristics (12-point front, 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

3.4. Procedure / Timeline

3.4.1. Pre-Competition

14 days prior to OEC	Competition Package <ul style="list-style-type: none"> The competition package will be released to the competitors, judges and public. Other details such as the timeline will also be released at this time. It is the competitor's responsibility to ensure that they have received the package.
7 days prior to OEC	Presentation Abstract <ul style="list-style-type: none"> 200 word abstract, detailed in section 3.4.5 (Deliverables) Layout and Specific Needs <i>Competitors must convey the following information to the Competition Director:</i> <ul style="list-style-type: none"> Any specific needs (layout, electrical, power supply, etc.) must be specified via Resource Request, detailed in Section 3.3.4 (Allowed External Resources). Presentation Slides <ul style="list-style-type: none"> Each team must submit a soft copy of their presentation slides to the Competition Director, detailed in 3.4.5 (Deliverables)
1 day prior to OEC	Competition Briefing <ul style="list-style-type: none"> The Competition Director will host a competition briefing, attended by the competitors (and possibly the judges), where details of the competition timeline and judging structure are discussed. There will be time allowed for questions.

3.4.2. Competition

3.4.2.1. *Competition Briefing*

The Competition Director will host a competition briefing, attended by the competitors (and possibly the judges), where details of the competition timeline and judging structure are discussed. There will be time allowed for questions.

3.4.2.2. *Question Period*

Competitors then have fifteen (15) minutes to ask the Competition Director 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.

3.4.2.3. *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.

3.4.2.4. *Judges' 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.

3.4.3. 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): 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 exceeds twenty (20) 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 Director
- The timing of the question period after the presentation shall be for information purposes only

3.4.4. Presentation Order

- The order of the presentations shall be determined randomly

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

3.4.5. Deliverables

3.4.5.1. 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 name(s), and Team Name.

3.4.5.2. 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 Director may assign the due date at their discretion to allow time for testing the presentation and printing hard copies. These slides will be used to aid the judges in keeping notes and providing feedback when necessary and desired.

3.5. 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

3.5.1. 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	/30
Presentation	Voice Articulation and Timing Visual Aids Response to Questions	/40
Written Abstract		/5
Penalties	Plagiarism Insufficient Citation Documents Received After Deadline Absent Team Member	-50 -50 -5/day -25
Total		/100

3.5.2. 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 seventeen (17) minutes, five (5) points/minute deduction for every minute under seventeen (17) minutes (e.g. a fifteen (15) minute presentation will result in a deduction of ten (10) points)
- For each attempt at entering the presentation room before the allotted time after the first warning attempt, ten (10) point deduction
- Note that there may be additional penalties according to the competition specific problem statement. All penalties will be provided in the grading rubric of the competition package.

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. Resources

4.3.1. Facilities Required

- Access to online platform for competitors to communicate and general execution of the event

4.2.2. Personnel Required

4.2.2.1. 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.

4.2.2.2. Competition Director

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

4.2.2.3. Debate Moderator

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

4.2.2.4. 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 livestream a timer to indicate the number of minutes a speaker has left to conclude their argument. The Moderator will also give a fifteen (15) second grace period should the debaters exceed the designated speaking time. If a question is asked in the first or last minute of the speech, the Timekeeper will indicate this to the Moderator so that it can be stopped. If a member of the debater team knocks on the table during the final fifteen (15) seconds, the Timekeeper will permit an extra and final fifteen (15) seconds of grace.

4.2.3. Equipment Provided by OEC

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

- One (1) display board is required to display the debate topic during the debate
- Access to an online timer card or stop watch

4.3.4. Allowed External Resources

Competitors are allowed to utilize shared notes for the debate. Competitors are permitted any resources in their 15 minute preparation periods (ie google, books, communication with others, etc). After this preparation period, competitors are only allowed their shared notes, and may not speak to each other or use any other resources for the remainder of the debate.

4.3. Debating Rules and Elements

4.3.1. 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 Moderator.

4.3.2. Resolutions

The resolutions will be assigned by the organizing committee and will be validated by the Debate Moderator 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 fifteen (15) minutes to prepare for the debate.

4.3.3. 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 moderator will allow a fifteen (15) second grace period. Upon the exhaustion of speaking time, loud pounding on tables will be deemed appropriate.

4.3.4. 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 squirrelled or converted into truisms. Squirrelling 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:

4.3.4.1. *The Principle Case*

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 can 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."

4.3.4.2. *The Plan Case*

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.

4.3.5. 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.

4.3.6. 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.

4.3.7. 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.

4.3.8. 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.

4.3.9. Questions

Questions directed to an opposing team will not be permitted during an online event.

4.3.10. Heckling

Heckling will not be permitted during an online event.

4.3.11. Points of Procedure

If a team believes that one of the rules of the debate have been broken, they must immediately alert the Moderator of the violation by entering the appropriate number as outlined below into the appropriate area in the online platform. The Moderator will then call upon the debater to make their case.. Finally, the Moderator will rule on the point by saying, "Point well taken" or "Point not taken." If it is obvious that the

Moderator is incorrect, the team should not argue with the Moderator, but expect the judges to compensate for the Moderator'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, and the corresponding number to be entered into the appropriate area in the online platform if a team wishes to bring up a point, as follows:

1. The resolution is not being interpreted at face value (squirreling)
2. Presenting new arguments during rebuttals
3. Unprofessional behaviour
4. Offensive behavior
5. Misquotations
6. Introduction of parts of a plan by the second speaker
7. General Procedural Issues

For example, if a competitor notices their opponent is squirreling, they can type "Order - 1" in the chat. This way the moderator can interject if required.

(*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 procedure are commonly seen to detract from a debate when offered incorrectly. Points of procedure that detract from the flow of a debate unnecessarily will be penalized by the judges.

4.4. Procedure / Timeline

4.4.1. Pre-Competition

These rules are to be made available to all competitors and judges at least two (2) weeks prior to the competition.

At least seven (7) days before the competition, the Competition Director will assign each team their designated Team Name for use at the competition. A competition briefing will be held before the commencement of the competition and will include the debate Moderator, timekeeper, Competition Director, VP Competitions, judges and competitors. The debate Moderator will run the briefing and review the rules, tips and expectations for the debates. 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. There is no timeline for this briefing and questions may be fielded at the discretion of the debate Moderator and Competition Director.

4.4.2. 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 Debates

competition. The schedule should also illustrate the path which a team will follow depending on wins and losses.

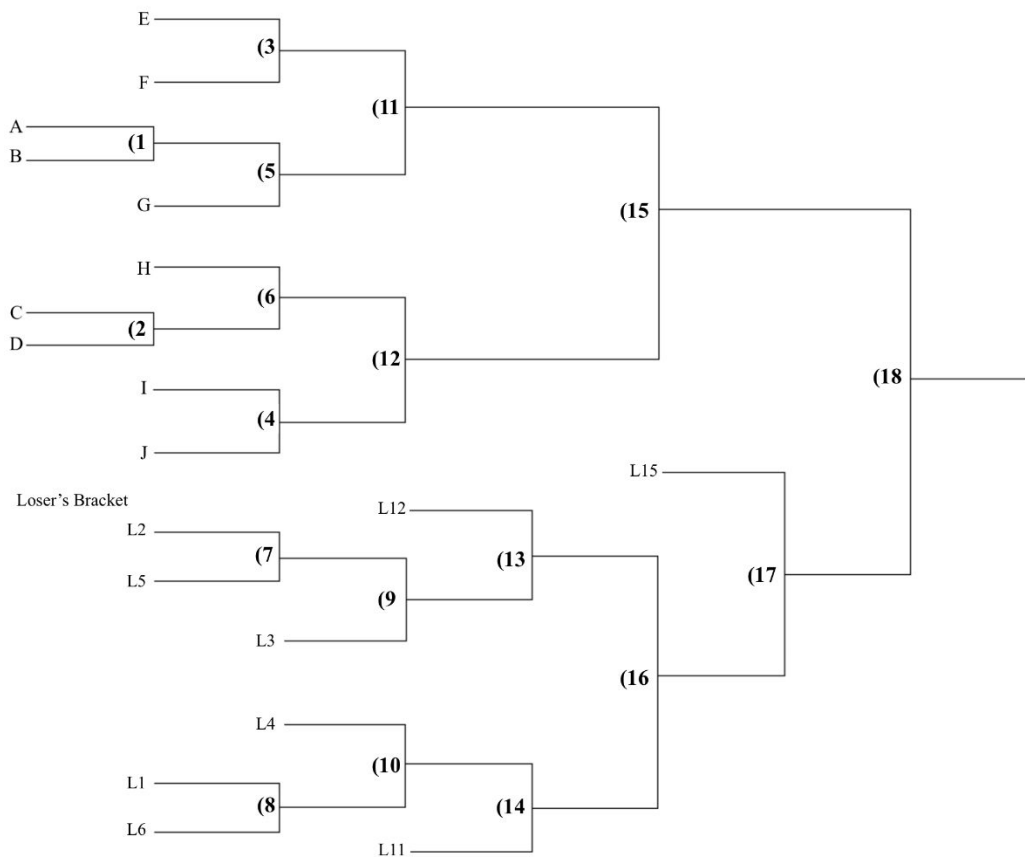
4.4.3. Double-Elimination

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 Director 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 see the graphic below for the sample bracket for a 10-team debate competition, where the number signifies the match number and Lx denotes the losing team of match number x.

Winner's Bracket



4.5. Assessment and Judging

4.5.1. 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 Moderator will tally the decisions and announce the winner. The winning team will then move to the next round.

4.5.2. 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 comprise 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
- The project should be a marketable final product

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 that analyses the applicability of the project's topic.

5.3. Resources

5.3.1. Facilities Required

An online platform (e.g. website) will be set up by the Organizing Committee for exhibition of the submitted competition deliverables. This online platform will be generally private, but public to attendees of the online OEC (e.g. observers, competitors, judges, etc.). It is the responsibility of the Organizing Committee and Competition Director to upload the competitors' deliverables to this online platform and then make it available to the attendees. However, competitors are responsible for submitting these deliverables on time in order for the Organizing Committee to upload the submissions.

Access to an online teleconferencing software will be provided for the scheduled question period with the judges.

5.3.2. Personnel Required

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

5.3.2.2. Competition Director

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

5.3.2.3. Official Timekeeper

The Official Timekeeper is typically the Competition Director who enforces the time limits and the rules governing the submitted deliverables.

5.3.3. Equipment Provided by OEC

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

- Access to the online platform where the submissions will be posted prior to the start of the competition
- Access to an online teleconferencing software for the scheduled question period with the judges

5.3.4. Allowed External Resources

Permitted resources outside the submitted deliverables, facilities, and equipment provided during the online hosting of this competition includes only the design prototype (physical or model). A list of resources must be provided to the Competition Director in accordance with Section 5.3.4.1

5.3.4.1. 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 5.3.3 (Equipment Provided by OEC). The Competition Director will review the requests and determine if the request is viable. The team will be informed early in the week before the competition if 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 the required resource

5.4. Procedure / Timeline

5.4.1. Pre-Competition

12 days prior to OEC	Submission Guidelines <ul style="list-style-type: none"> The Competition Director will provide the competition package and submission deliverable constraints and guidelines to the competitors via their provided email addresses. The main theme(s) dealt with during the competition will be announced.
5 days prior to OEC	Deadline for Deliverables <ul style="list-style-type: none"> A one (1) pre-recorded video presentation, detailed in Section 5.4.5 (Deliverables). A one (1) virtual project poster, detailed in Section 5.4.5 (Deliverables). A one (1) project design summary, detailed in Section 5.4.5 (Deliverables).
1 day prior to OEC	Competition Briefing <ul style="list-style-type: none"> The Competition Director 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.

5.4.2. Competition

5.4.2.1. Competition Briefing

One (1) day prior to the competition, the Competition Director 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.

5.4.2.2. Question Period

Competitors then have fifteen (15) minutes to ask the Competition Director 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.

5.4.2.3. Judging

The judges will go through the submitted deliverables and will have a scheduled ten (10) minute question period with each team... The competitors must only reference their prototype, presentation video, and project poster to illustrate their work.

5.4.3. Timekeeping

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

- Competitors will be penalized for having a video submission that exceeds twenty (20) minutes

- Time to both ask and answer questions during the question period is counted in the ten (10) minute question period

5.4.4. Presentation Order

- Presentation order shall be determined randomly
- Presentation order shall be announced thirty (30) minutes before the presentations commence
- Teams are not allowed to switch places in the presentation order

5.4.5. Deliverables

5.4.5.1. Design Summary

Prior to the competition, the team must submit a design summary at least five (5) days before the start of the competition. The purpose of this summary is to give an introduction to the project topic. This summary will follow conventional formatting characteristics (12-point front, 1.5 line spacing, 1" paper margins) and is limited to one half (1/2) a page or 300-words. The summary must include, but is not limited to:

- Team Name
- Team Members
- Design topic and description

5.4.5.2. Presentation Video and Virtual Poster

A pre-recorded presentation video and virtual poster must be submitted to the Competition Director at least five (5) days before the start of the competition. Guidelines on what is to be included in the video and poster will be provided by the Competition Director at least twelve (12) days before the submission deadline and seventeen (17) days before the start of the competition. The presentation video is not to exceed twenty (20) minutes.

5.5. 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

5.5.1. Judging Matrix

Project	Design Justification Environmental, Social, Economic, and technical Feasibility Innovation	/30
Video Presentation	Voice, Articulation, and Timing (audio quality) Visual Aids (video quality) Response to Questions	/40
Poster	Visual Quality Content	/20
Written Abstract	Grammar and Writing quality Content	/10
Penalties	Plagiarism	-50
	Insufficient Citation	-50
	Documents Received After Deadline	-50
	Absent Team Member	-25
	Abstract over the specified limit	-10
	Video over the time limit	-5/min
Total		/100

5.5.2. Penalties

Note that there may be additional penalties according to the competition specific problem statement. All penalties will be provided in the grading rubric of the competition package.

6. Junior Design

This competition challenges junior engineering students to design and build a prototype to address a technical problem. This competition is weighted more towards prototype functionality than design defense.

6.1. Team Composition

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

6.2. Resources

6.2.1. Facilities Required

- An online chat platform for communication questions and answers between the competitors and Competition Director
- Access to an online teleconferencing software for competitors to present their deliverables

6.2.2. Personnel Required

6.2.2.1. 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.

6.2.2.2. Competition Director

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

6.2.2.3. Official Timekeeper

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

6.2.3. Equipment Provided by OEC

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

6.2.3.1. During the design phase

- An online chat platform for communicating questions and answers between the competitors and Competition Director
- A method to submit required documents

- Information relevant to the design problem, at the discretion of the Competition Director
- A material kit specific to the design problem

6.2.3.2. During the presentation

- Access to an online teleconferencing software for competitors to present their deliverables with screen sharing and other necessary functionality
- Up to one (1) computer containing the team's deliverable files

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.

6.2.4. Allowed External Resources

The competitors may bring any equipment as deemed reasonable by the Competition Director, this includes but is not limited to equipment that is reasonable to expect all participants to have access to in some capacity, such as a utility knife.

6.3. Procedure / Timeline

6.3.1. 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 Director will assign each team their designated Team Name for use at the competition, list of recommended or required resources, and a detailed competition timeline will also be provided as well as any background information which may be deemed necessary by the Competition Director.

6.3.2. Competition

6.3.2.1. Presentation of Problem

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

6.3.2.2. Question Period

Competitors then have fifteen (15) minutes to ask the Competition Director 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.

6.3.2.3. 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 Director before the allotted time expires. Competitors may finish before the end of the allotted time.

6.3.2.4. Rest Period

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

6.3.2.5. Presentation and Tests

Competitors have ten (10) 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 ten (10) minutes to ask questions. The prototype will be available during the presentation.

Each team will then carry out a set number of demonstration tests of their design. The number and length of tests must be dictated by the Competition Director during the presentation of the problem. The testing may be carried out at the discretion of the Competition Director.

6.3.3. Timekeeping

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

6.3.3.1. 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

6.3.3.2. 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 ten (10) 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

6.3.4. 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 observe the demonstration of their competition

6.3.5. Deliverables

6.3.5.1. From Competitor

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. Other necessary deliverables will be outlined in the competition package.

6.3.6. Response to Questions

- Only the Competition Director 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 Director 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

6.4. Demonstration Assessment and Judging

- The panel must have an odd number of judges
- The panel must have at least three (3) judges
- The demonstration assessment shall be carried out in the audience's presence

6.4.1. Judging Matrix

Design Quality	Deliverable Compliance with Expectations Technical Feasibility/Innovation Use of Resources	/30
Presentation	Design Process Design Justification Design Critique Voice Articulation and Timing Visual Aids Response to Questions	/40
Testing	Working prototype, meeting design challenges	/30
Penalties	Plagiarism 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 -25 -10 -10 -10
Total		/100

6.4.2. 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.

6.4.3. Penalties

Note that there may be additional penalties according to the competition specific problem statement. All penalties will be provided in the grading rubric of the competition package.

7. Senior Design

A team of up to four (4) students are given a complex engineering problem and are required to design and build a working prototype. This competition focuses on both a working prototype and design theory, but more on design theory (see the rubric below). The teams will then present their solution in front of a panel of judges.

7.1. Team Composition

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

7.2. Resources

7.2.1. Facilities Required

- An online chat platform for communication questions and answers between the competitors and Competition Director
- Access to an online teleconferencing software for competitors to present their deliverables

7.2.2. Personnel Required

7.2.2.1. 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.

7.2.2.2. Competition Director

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

7.2.2.3. Official Timekeeper

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

7.2.2.4. 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.

7.2.3. Equipment Provided by OEC

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

7.2.3.1. During the design phase

- An online chat platform for communicating questions and answers between the competitors and Competition Director
- A method to submit required documents
- Information relevant to the design problem, at the discretion of the Competition Director
- A material kit specific to the design problem

7.2.3.2. During the presentation

- Access to an online teleconferencing software for competitors to present their deliverables with screen sharing and other necessary functionality
- Up to one (1) computer containing the team's deliverable files

7.2.4. Allowed External Resources

The competitors may bring any equipment as deemed reasonable by the Competition Director, this includes but is not limited to equipment is reasonable to expect all participants to have access to in some capacity, such as a pocket knife.

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.

7.3. Procedure / Timeline**7.3.1. 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 Director will assign each team their designated Team Name for use at the competition.

7.3.2. Competition*7.3.2.1. Presentation of Problem*

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

7.3.2.2. Question Period

Competitors have fifteen (15) minutes to ask the Competition Director 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.

7.3.2.3. 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 Director before the allotted time expires. Competitors may finish before the end of the allotted time.

7.3.2.4. Rest Period

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

7.3.2.5. Presentation and Demonstration Period

The presentation schedule will be posted exactly (30) minutes prior to the first presentation. 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. A collective demonstration period will then be held for competitors to showcase their designs. (The format will be live and/or video submissions, at the discretion of the Competition Director). The demonstration/testing may be carried out at the discretion of the Competition Director.

7.3.3. Timekeeping

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

7.3.3.1. During the design phase

- Time is started with the declared end of 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

7.3.3.2. 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

7.3.4. Presentation Order

- Presentation order shall be determined randomly
- Presentation order shall be announced thirty (30) minutes before the presentations commence.

- Teams are not allowed to switch places in the presentation order
- Teams may observe the demonstrations of their competition

7.3.5. Deliverables

7.3.5.1. *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 Director.

7.3.5.2. *From Competitors*

Each team is required to submit a prototype of their design before the end of the design period. The prototype can be in the form of a simulated and/or a physical design as outlined in the competition package. This design will be used to test the team's solution to the design problem. Each team is required to submit, electronically, before the end of the design period, a presentation about their design. The requirements of the presentation will be outlined in the competition package.

7.3.6. Response to Questions

- Only the Competition Director 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 Director 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.

7.4. 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 Directors will develop specific penalties for violations of rules, which will be provided to competitors in the competition briefing

- Any live demonstrations or testing will be screen recorded to allow for fair resolution of any disputes

7.4.1. Judging Matrix

Design Quality	Deliverable Compliance with Expectations Environmental, Social, and Economic Consideration Technical Feasibility/Innovation Use of Resources Mechanical, Software, and Electrical creativity & design defense CAD and metrics obtained from this model to justify the design	/30
Presentation	Design Process Design Justification Design Critique Voice Articulation and Timing Visual Aids Response to Questions	/50
Testing	Working prototype, meeting design challenges	/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

7.4.2. 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.

7.4.3. Penalties

Note that there may be additional penalties according to the competition specific problem statement. All penalties will be provided in the grading rubric of the competition package.

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 consist 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. Resources

8.3.1. Facilities Required

- An online chat platform for communicating questions and answers between the competitors and Competition Director
- An online teleconferencing software for competitors to present their deliverable

8.3.2. Personnel Required

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

8.3.2.2. Competition Director

The Competition Director is responsible, along with the VP Competitions, for the design and implementation of the Re-engineering competition. The Competition Director must present the problem at the beginning of the competition and answer any questions raised by competitors. Only the Competition Director may answer questions during the design period. The Competition Director will also answer any questions the judges may have during the competition.

8.3.2.3. 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.

8.3.3. Equipment Provided by OEC

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

8.3.3.1. During the design phase

- An online chat platform for communicating questions and answers between the competitors and Competition Director
- Some information relevant to the design problem, at the discretion of the Competition Director

8.3.3.2. During the presentation

- An online teleconferencing software for competitors to present their deliverables with screen sharing and other necessary functionality
- Up to one (1) computer containing the team's presentation file

8.3.4. Allowed External Resources

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.

8.4. Procedure / Timeline

8.4.1. 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 one (1) week 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.

8.4.2. 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 one (1) week 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.

8.4.3. Competition

8.4.3.1. *Presentation of Problem*

The first case set will be distributed to the competitors one (1) week 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 enough to allow for the reading of the 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.

8.4.3.2. *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.

8.4.3.3. *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 Director before the end of the allotted time. Competitors may finish before the end of the allotted time.

8.4.3.4. *Rest Period*

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

8.4.3.5. *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.

8.4.4. Timekeeping

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

8.4.4.1. During the design phase

- Time is started with the declared end of 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

8.4.4.2. 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

8.4.5. 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

8.4.6. Deliverables*8.4.6.1. 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 one (1) week 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 Director.

8.4.6.2. 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 (excluding 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 within the limit 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.

8.4.7. Response to Questions

- Only the Competition Director 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 Director 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. 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 within forty-eight (48) hours

8.5. Assessment and Judging

- The panel must have an odd number of judges
- The panel must have at least three (3) judges

8.5.1. Judging Matrix

		Case 1	Case 2
Solution	Functionality of Proposed Changes Environmental, Social and Economic Feasibility Technical Feasibility Real-world Applicability	/40	/20
Report	Clarity Writing Style and Professionalism Deliverable Compliance with Expectations	/15	
Presentation	Voice Articulation and Timing Visual Aids Response to Questions	/25	
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	

8.5.2. Penalties

Note that there may be additional penalties according to the competition specific problem statement. All penalties will be provided in the grading rubric of the competition package.

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 consist of a maximum of four (4) competitors.

9.2. 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.

9.3. Resources

9.3.1. Facilities Required

- An online chat platform for communicating questions and answers between the competitors and Competition Director
- An online teleconferencing software for competitors to present their deliverables

9.3.2. Personnel Required

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

9.3.2.2. Competition Director

The Competition Director is responsible, along with the VP Competitions, for the design and implementation of the Programming competition. The Competition Director must present the design problem at the beginning of the competition and answer any questions raised by competitors. Only the Competition Director may answer questions during the design period. The Competition Director will also answer any questions the judges may have during the competition.

9.3.2.3. Timekeeper

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

9.3.3. Equipment Provided By OEC

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

9.3.3.1. *During the design phase*

- An online chat platform for communicating questions and answers between the competitors and Competition Director
- A method to submit the team presentation
- Information relevant to the design problem, at the discretion of the Competition Director

9.3.3.2. *During the presentation*

- An online teleconferencing software for competitors to present their deliverables with screen sharing and other necessary functionality
- Up to one (1) computer containing the team's presentation file

9.3.4. External Resources Allowed

The competitors may bring any external resources that they desire, given that they are able to transport them without assistance from any OEC volunteers.

9.3.5. 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. However, OEC will not place restrictions on what languages are to be used for the competition.

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 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.

9.4. Procedure/Timeline

9.4.1. 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 Director 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.

9.4.2. Competition

9.4.2.1. Problem presentation

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

9.4.2.2. 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.

9.4.2.3. 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 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.

9.4.2.4. Rest period

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

9.4.2.5. 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.

9.4.3. Timekeeping

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

9.4.3.1. During the design phase

- Time is started with the declared end of the competition briefing
- 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

9.4.3.2. 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 10 minutes, 5 minutes and 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 30 seconds of the presentation

9.4.4. 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

9.4.5. Deliverables

9.4.5.1. 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 Director. 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 Director.

9.4.5.2. 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 Programming Competition Director will be used for evaluation.

9.4.6. Response to Questions

- Only the Competition Director 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 Director 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

9.5. 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

9.5.1. Judging Matrix

Design/Strategy/Algorithm	Simplicity Ingenuity Ability to Achieve Desired Outcome	/40
Performance & Code	Structure Readability Efficiency	/30
Originality & 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

9.5.2. Penalties

Note that there may be additional penalties according to the competition specific problem statement. All penalties will be provided in the grading rubric of the competition package.