Ontario Engineering Competition 2019

Official Rulebook

Table of Contents

1 General Rules and Definitions

The term 'Competition Lead' refers to the individual responsible for the competition in which the section is founded. The Competition Lead is appointed or chosen by the organizing committee and is the primary means of contact for competitors, judges and a liaison between the organizing executives.

1.1   Eligibility

The Vice Presidents of Competitions determines the eligibility of all competitors, teams, and projects according to the following guidelines set out in this rulebook, and with their discretion.

1.2   Qualification

1. The competitors, teams, and projects must have qualified during an internal qualifying round hosted by an active member school of the Engineering Student Societies' Council of Ontario (ESSCO) or by and Ontario Engineering Competition – Only member school of ESSCO.

2. First place teams from internal qualifiers are eligible. For some competition categories second place teams may be eligible as well, at the discretion of the VP Competitions. If first or second place teams are unable to attend OEC due to medical, personal or other legitimate reasons the 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 1.3 and 1.5.

3. 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   Competitors

1. All competitors must be enrolled in an undergraduate program in Ontario and at least half of the competitors making up any one team must be enrolled in an undergraduate engineering program in Ontario at the time of the competition except in the following case:
    a. In the case of Innovative Design, the competitors must either be in their second to last or last year of their undergraduate degree, or have graduated less than a year prior to competing. The project being entered must be a project completed prior to 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.

1.4   Project

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.

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 Lead, may be entered.

3. For the competition category of Re-Engineering the work submitted for Phase I/Case I (to be completed prior to the competition) must be all original reports, which are the work of the competitors, and with all contributing sources cited. For Phase II/Case II (to be completed during the competition) only work conducted by the competitors during the allocated competition time, with all contributing sources cited, and using only the material outlined by the Competition Lead, may be entered.

4. For the competition category of Programming, only an original solution conducted by the competitors during the allocated competition time (with the exception of macros and environmental setups are fine), and that is the work of the competitors may be entered. All contributing sources (including open-source and freely-available modules used in solution) must be cited.

5. Work done during the course of 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.

1.5   Substitutions

1. The team appearing at the Ontario Engineering Competition must be comprised of the whole original team as it competed at its respective internal competition.

a. 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 provided that they meet all of the qualifications as outlined in this document. This may only be done in cases where 50% of the original team from the internal qualifiers will be competing and at the discretion of the VP Competitions. The team, with substitutions included, must have the same number of members as the original competing team, and all substitutions must meet the criteria outlined in 1.3.

b. At the discretion of the winning team and competing engineering society, if all or more than 50% of the original competition team is unable to attend due to medical, personal, or other legitimate reasons (as approved), then the second place team from the internal competition shall be eligible to compete.

1.6   Regulation Amendments

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

1.7   Violation of competition rules

In the event that a competitor is believed to have violated:

a) A rule in this rulebook,

b) A rule included in the problem statement given to competitors explaining their challenge, or

c) A 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.

1.7.1   Procedure

1. The Competition Lead will determine if competitor(s) are in violation of the rules.

   1.1. 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.

1.1.1. Competitors will be provided in writing the alleged violation of the rules following the design phase.

1.1.2. This communication of a rule violation shall be reported to the team by the Competition Lead (or an acting representative) to ensure the competitor(s) are immediately made aware of the situation.

1.2. If competitor(s) are found guiling of a violation following the conclusion of the design phase, and either before, after, or during the presentation and testing phases, competitors have one (1) hour to appeal the Competition Lead decision to the Rule Violation Committee (RVC). The appeal must be written and clearly explain why the competitors believe they followed the rules of the competition. Appeals shall be limited to one page with size 12 font single spaced.

1.3. 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 of the Vice President of Competitions and 3 other executive members. (One executive member will act as non-voting chair.)

2.1. It is preferred that the chair(s) of the Ontario Engineering Competition is/are among the voting members of the RVC.

2.2. The RVC will have one (1) hour to review the appeal and vote to dismiss or hold the Competition Lead's decision.

2.3. Competitor(s) will be immediately notified of the RVC decision.

2.3.1. The decision of the RVC is final, and not subject to appeals.

3. In the event of 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.

2 Consulting Engineering

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

2.1 Team Composition

The Consulting Engineering team will be comprised of a maximum of four competitors. At least half of the design team must be representing an undergraduate engineering program at an ESSCO-member school or OEC-Only ESSCO member school. All competitors and teams must also meet the requirements outlined in sections 1.1 Eligibility, 1.2 Qualification, and 1.3 Competitors.

2.2 Topic

It is recommended that the topic incorporate more than one engineering discipline. However, while the topic should challenge competitors' technical knowledge and skills, it should also require competitors to evaluate the economic, environmental, political and social implications of their proposed solutions and address the requirements of the customer. The winning solution will not necessarily be the most technically effective solution, but the solution that has the most real-world applicability and forethought.

Therefore, the topic should be one that could exist in the real world. Topics drawn from reality must be fully documented. All necessary documentation must be provided to the competitors when the problem is presented.

2.3 Resources

2.3.1 Facilities Required

- 1 amphitheater (presentation of problem and team presentations)
- 1 workroom per team (design of solution, possibility the hotel room)
- Simultaneous translation equipment (if requested by competitors prior to OEC when judges are not bilingual)

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   The Competition Lead

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

- A workroom or workspace
- A method to submit the team presentation
- Internet connectivity
- Information relevant to the design problem, at the discretion of the Competition Lead

The following equipment will be available to teams during the presentation phase:

- 1 digital projector
- 1 computer containing the team's presentation file
- Simultaneous translation equipment if judges are not bilingual (if requested by competitors prior to OEC when judges are not bilingual)
- Whiteboard(s) or blackboard(s)

2.3.4   Allowed External Resources

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

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

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

2.4 Procedure / Timeline

2.4.1   Pre-Competition

At least seven days (168 hours) prior to the competition, the main theme(s) of the competition will be announced to the competitors, judges and public. 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   Judges Briefing

At least half an hour before the competitors are given the 'Presentation of the Problem', the judges should be given the 'Presentation of the Problem', so that they can ask questions without taking time away from the competitors' 'Question Period'. This ensures that time can effectively be used to address judges concerns, which may be different than competitor concerns.

2.4.2.2   Presentation of the Problem

The problem must be presented to all competitors at the beginning of the competition, after the 'Judges Briefing' has occurred. The Competition Lead must provide detailed explanations of what is expected from the competitors, both orally and in writing.

2.4.2.3   Question Period

Directly after the 'Presentation of the Problem' competitors then have 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 15 minutes. Time used by judges to pose questions will not be counted.

2.4.2.4   Solution Development

Teams will be given 4-8 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 Lead before the end of the allotted time. Competitors may finish before the end of the allotted time.

2.4.2.5   Rest Period

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

2.4.2.6   Solution Presentations

Competitors will have a maximum of 15 minutes to present their solutions. All team members must be present and participate in the presentation or the team will be penalized by the judges. Judges then have a maximum of 10 minutes to ask questions. Judges can ask a question at any time during the presentation. The clock should be stopped during these interruptions.

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 when the teams leave the competition briefing.
- The remaining time must be announced 3 hours, 1 hour, 30 minutes, and 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 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 competition.

2.4.4   Presentation Order

- Presentation order shall be determined randomly.
- Presentation order shall be announced at least one half-hour 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 7 days in advance of the competition. This theme will also be posted on the official OEC website. It is the competitors' responsibilities to ensure that they have received the package.

Each team will receive, in hard copy, a package outlining the problem definition, design and presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Lead on the day of the competition.

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 15 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 Lead may answer questions during the problem presentation and design phases. Volunteers and judges may not answer questions regarding rules and procedures at any time.

- During the presentation of the problem, the Competition Lead shall answer orally and write down the answers provided.

- During the design phase, only questions related to deliverable content shall be answered. No answers shall be provided in response to questions about the problem that might lead to the development of a new approach or which might invalidate a solution.

- During the design phase, answers to questions shall be provided in writing to all teams at the same time. 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.

- The judges should be bilingual or the room equipped for simultaneous translation (if requested by competitors prior to OEC).

- The presentations shall be carried out without an audience.

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

2.5.1 Judging Matrix

Solution	Addresses Problem Statement Innovation Environmental, Social, and Economic Analyses Technical Feasibility Real-World Applicability Risk Analysis	**60%**
Report	Clarity, Writing Style and Professionalism Deliverable compliance with expectations	**15%**
Presentation	Voice, Articulation and Timing Visual Aids	**25%**
Plagiarism or Insufficient Resource Citations		**-50%**
Documents Received After Deadline		**-50%**
Exceeding Page Limit		**-20%**
Total		**100%**

3 Engineering Communications

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

3.1 Team Composition

The Engineering Communications team will be comprised of a maximum of two competitors. At least half of the design team must be representing an undergraduate engineering program at an ESSCO-member school or OEC-Only ESSCO member school. All competitors and teams must also meet the requirements outlined in sections 1.1 Eligibility, 1.2 Qualification, and 1.3 Competitors. Should the presenting team be a subset of a project team, the remaining members of the project team must sign a letter authorizing presentation of the project in order for it to be eligible for the competition. This letter must be submitted with the competition abstract if applicable.

3.2 Topic Eligibility

The topic should fulfill the following criteria:

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

3.3 Resources

3.3.1 Facilities Required

- 1 room for presentations

3.3.2 Personnel Required

3.3.2.1 Judges

A minimum of three (3) 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 Lead

The Competition Lead is responsible for the implementation of the Engineering Communications competition. The Competition Lead, or Competition Lead representative, must be present at all of 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.

3.3.3 Equipment Provided by OEC

The following equipment will be available for use by the competitors during their presentations:

- 1 Digital projector
- 1 table

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.

Competitors are expected to present via their own computer and required adapter. It this is not possible competitors must submit a resource request to the Competition Lead.

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

This request will follow conventional formatting characteristics (12 point 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

7 days prior to OEC	**Presentation Abstract** ▪ 200 word abstract , detailed in Section 2.4.5 (Deliverables). **Layout and Specific Needs** Competitors must convey the following information to the Competition Lead: ▪ Any specific needs (layout, electrical, power supply, etc.) must be specified via Resource Request, detailed in Section 2.3.5 (Resource Request). **Presentation Slides** ▪ Each team must submit a soft copy of their presentation slides to the Competition Lead, detailed in 2.4.5 (Deliverables).
12 hours prior to OEC	**Competition Briefing** ▪ The Competition Lead will host a competition briefing, attended by the competitors and judges, where details of the competition timeline and judging structure are discussed. There will be time allowed for questions.

3.4.2   Competition

3.4.2.1   Presentation Period

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

3.4.2.2   Question Period

The judges then have a maximum of ten (10) minutes to ask questions.

3.4.3   Timekeeping

Points will be deducted if competitors do not adhere to the time limit. The following are rules concerning timing that must be followed.

- The time must be stopped when a judge asks question 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): 10 minutes, 5 minutes, and 1 minute before the end of the presentation.
- A visual countdown must be given during the last 30 seconds of the presentation.
- 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.
- Competitors shall be informed of their presentation time the night before the competition.

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.

This abstract will follow conventional formatting characteristics (12 point front, 1.5 line spacing, 1" paper margins) and is limited to two hundred (200) words. The abstract must include, but is not limited to:

- Team name
- Team members
- School and team A/B if applicable
- Presentation topic

Competitors must supply a soft copy of their presentation to the Competition Lead at least 7 days prior to the day of the competition. The Competition Lead 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.

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

3.5.1   Judging Matrix

Topic	Appropriate complexity Interest elicited by topic	10%
Content	Topic clearly presented Accuracy of explanation	20%
Critical Analysis	Social, environmental, and political impacts analyzed Quality of arguments	25%
Presentation Mechanics	Visual aids Speaker Quality Presentation Organization Response to Questions	40%
Written Abstract		5%
Total		**100%**

3.5.2   Penalties:

- For every minute the presentation excesses the time limit, 5 point deduction
- Late start to presentation due to competitor
- For every three grammar or spelling mistake in the presentation or abstract, 1 point deduction
- Late submission or presentation abstract or slides, 5 points deduction each

4 Extemporaneous Debate

Extemporaneous 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

An Extemporaneous Debate Team will be comprised of a maximum of two competitors. At least half of the team must be representing an undergraduate engineering program at an ESSCO-member school or OEC-Only ESSCO member school. All competitors and teams must also meet the requirements outlined in sections 1.1 Eligibility, 1.2 Qualification, and 1.3 Competitors.

4.2   Resources

4.2.1   Facilities Required

- 2 amphitheaters
- Rooms for judges' deliberation

4.2.2   Personnel Required

4.2.2.1   Judges

A minimum of three (3) judges per room are required to assess the problem solving abilities, proposed solution, communication skills and team dynamics of the competitors. If there are more than three judges, an odd number must be maintained. 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 Lead

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

4.2.2.3   Debate Mediator/Debate Chair

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

The Chair of the debate ensures the rules of the debate are upheld. He or she grants the right to speak (introduces the debater) and enforces the time limits. Most importantly, the Chair makes rulings on the "points of procedure" put forward by the debaters. The decisions of the Chair are final.

4.2.2.4   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 use hand signals to indicate the number of minutes a speaker has left to

conclude their argument. The Timekeeper will also give a fifteen (15) second final countdown. If

a question is asked in the first or last minute of the speech, the Timekeeper will indicate this to the Chair so that it can be stopped. If a member of the debater team knocks on the table during the final fifteen (15) seconds, the Timekeeper will permit an extra and final fifteen (15) seconds of grace.

4.2.3   Equipment Provided by OEC

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

- Simultaneous translation equipment (if requested by competitors prior to OEC when judges are not bilingual).

The layout of the amphitheatre should place the tables and podium at the front of the room. The first row of the amphitheatre will be reserved for the judges, moderator and timekeeper. This should be completed to allow for a preparation room for the opposition.

4.2.4   Allowed External Resources

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

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 expected to act responsibly at all times. Inappropriate language or offensiveness towards the other team, the officials, or the audience is not acceptable. Teams are expected to direct all of their speeches towards the chair.

4.3.2   Resolutions

The resolutions will be assigned by the Competition Lead and will be validated by the Debate Chair (if not the same person as the Competition Lead) 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 (eg, "Be it resolved that all engineers are good at math" is not a good

resolution, since there are always exceptions). Once both teams are informed of the resolution, they are given ten 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: 5 minutes
- First speaker of the opposition: 5 minutes
- Second speaker of the government: 5 minutes
- Second speaker of the opposition: 5 minutes
- Rebuttal by the first speaker of the opposition: 2 minutes
- Rebuttal by the first speaker of the government: 2 minutes

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

4.3.4   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 squirreled or converted into truisms. Squirreling is the act of redefining the resolution so that it has a meaning different than the one intended by the resolution. The government must also avoid specific knowledge debates where the average engineer has no familiarity with the topic. The government can follow one of two different strategies in the debate:

4.3.4.1   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 particular situation relating to the resolution. The contention must be about one major topic and may be a restatement of the resolution.

Example contentions for the above principles would be: "Engineering students should be required to take more complementary studies classes" and "People should be discouraged from going to a doctor unless necessary."

4.3.4.2   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 that 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 are a secondary means of refuting arguments. They can promptly point out

deficiencies in ideas. The debater who currently holds the floor has the authority to take or

ignore questions. The opponent who wishes to ask a question indicates their desire by simply

standing up and extending an arm forward. If the debater does not wish to take the question, he or

she can so indicate by a wave of the hand or a simple "no, thank you." If this occurs, the

inquiring party must sit down. If the current debater wishes to entertain the question, it must be

stated by the opponent in less than 15 seconds during which the speaker must yield the floor.

Both team members may take part in answering the question. The time used to ask and answer the

question comes out of the current debater's allotted time. Each debater must accept one question

during his or her speech, if the opponent is making an honest attempt to ask a question. Three

attempts at asking a question in one speech constitutes an honest attempt. Questions will not be allowed in the first or last minute of a speech, or during rebuttals.

4.3.10 Heckling

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

4.3.11 Points of Procedure

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

- unprofessional behavior;
- offensive behavior;
- misquotations;
- speaking to the opposition instead of the audience;
- presenting new arguments in the rebuttal;
- introduction of parts of a plan by the second speaker.

(*If the government has presented a truism or specific knowledge case, the opposition must wait until the end of the first debater's speech to point this out.) Moreover, if the officials have failed to follow the rules of debate (incorrect speaking order, too much speaking time allowed, etc.), it may be politely pointed out to them with a Point of Procedure.

Points of procedure are commonly seen to detract from a debate when offered incorrectly. Points of procedure which take away from the flow of a debate unnecessarily will be penalized by the judges.

4.4 Procedure / Timeline

4.4.1 Pre-Competition

These rules are to be made available to all competitors and judges at least 1 month prior to the competition.

A competition briefing will be held before the commencement of the competition and will include the debate moderators/chairs, timekeeper, Competition Director, VP Competitions, judges and competitors. The debate moderators/chairs will run the briefing and review the rules, tips and expectations for the debates. The purpose of the briefing is not to elude 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 moderators and Competition Lead.

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.

(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 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 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 or more times in a row, due to the dynamic nature of the format,

however the Debate 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 graphics below for sample breakdowns for 8 and 9 team debate competitions, where

the number signifies the match number and Lx denotes the losing team of match number x.

Double Elimination – 8 Teams
Double Élimination – 8 Équipes

A
B
1
7
C
9
D
2
E
14
F
3
G
10
H
4
I
16
L9 / P9
L7 / P7
11
L1 / P1
8
L2 / P2
5
13
L3 / P3
L10 / P10
12
L4 / P4
6
L14 / P14
15

Double Elimination – 9 Teams
Double Élimination – 9 Équipes
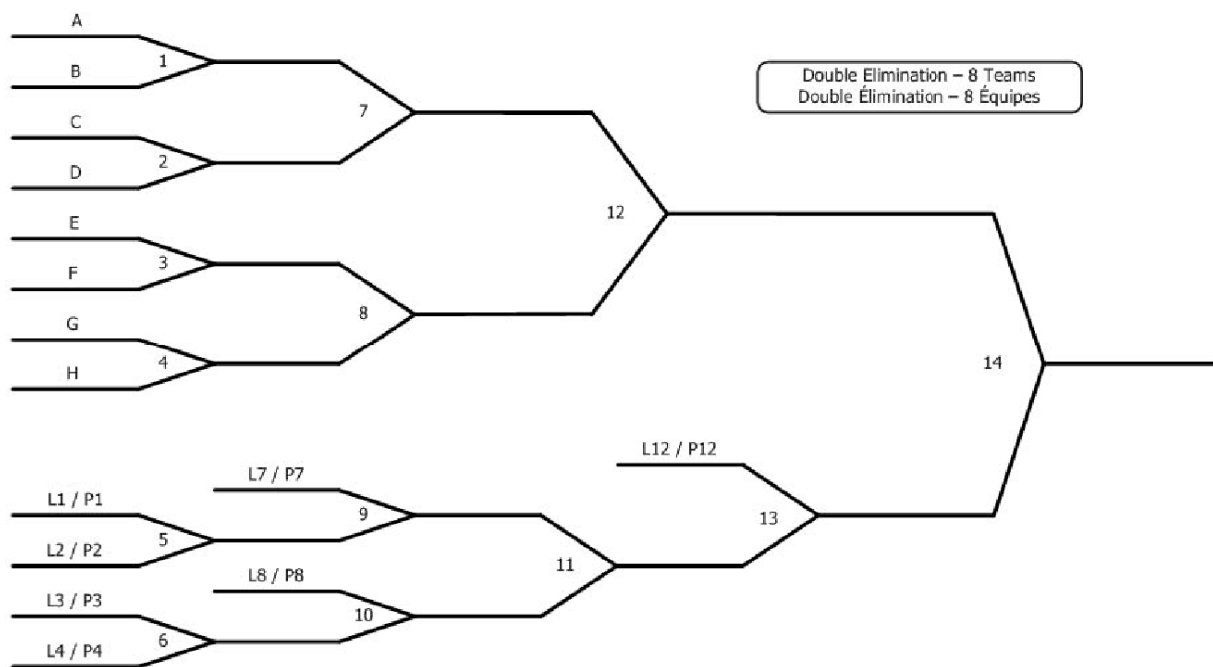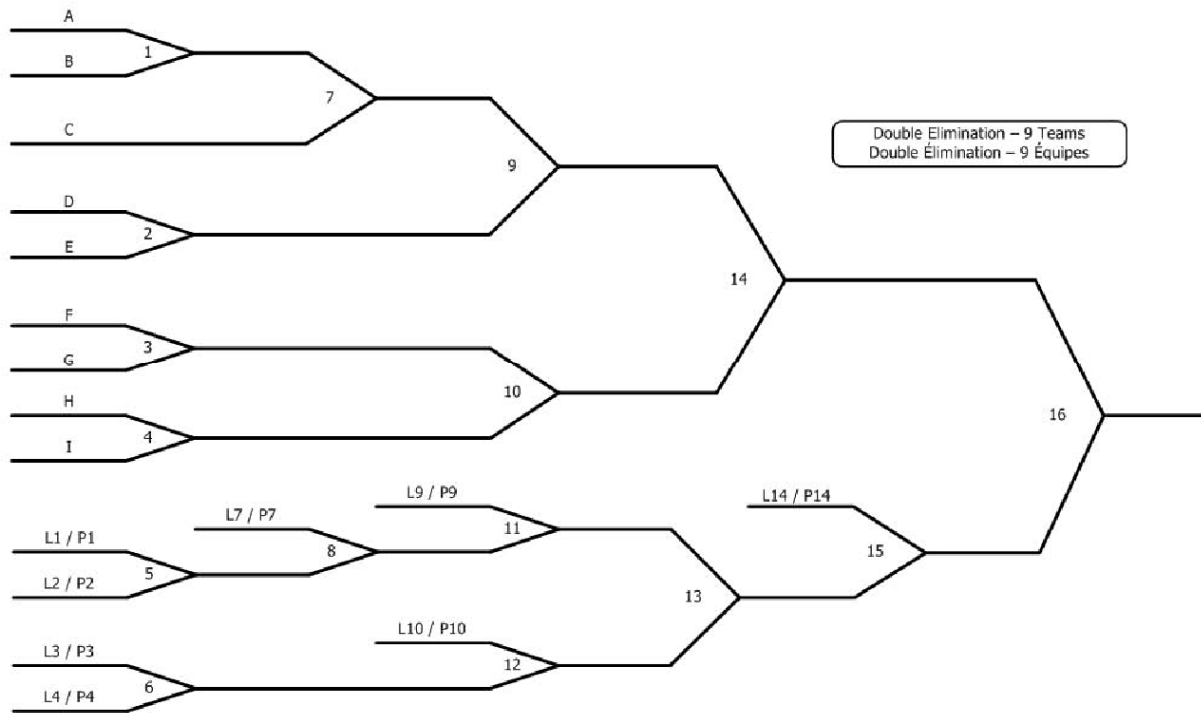
4.5   Assessment and Judging

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 chair 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 Ontario Engineering Competition. Competitors choose their own topic, prepare research and develop a design. The designs must be new and innovative and address a void in society.

5.1   Team Composition

The Innovative Design team may be comprised of one to four competitors. At least half of the team must be representing an undergraduate engineering program at an ESSCO-member school or OEC-Only ESSCO member school. All competitors and teams must also meet the requirements outlined in sections 1.1 Eligibility, 1.2 Qualification, and 1.3 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 in order for it to be eligible for the competition.

5.2   Topic/Project Eligibility

The topic should adhere to the following criteria:

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

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

5.3   Resources

5.3.1   Facilities Required

An exhibition room is required to allow competitors to set up displays and perform presentations for the judges. This hall should be in a central location and must be open to the public during the competition.

5.3.2   Personnel Required

5.3.2.1   Judges

A minimum of five judges are required to assess the skills, abilities, and topics of the competitors.

5.3.2.2   Competition Lead

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

5.3.2.3   Official Timekeeper

The Official Timekeeper is will enforce the time limits and the rules governing the displays.

5.3.3   Equipment Provided by OEC

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

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

5.3.4   Allowed External Resources

There is no restriction on the resources which competitors are allowed to bring to the competition. A list of resources must be provided to the Competition Lead in accordance with Section 4.4.1.

5.3.5 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 4.3.3. The Competition Lead will review the requests and determine if the request is viable. Team will be informed early in the week before the competition is their request can be accommodated.

This request will follow conventional formatting characteristics (12 point 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

5.4   Procedure / Timeline

5.4.1   Pre-Competition

12 days prior to OEC	**Announcement of Constraints** ▪ Space constraints and other logistical constraints must be described to the competitors (maximum display dimensions, maximum display height, use of flammable or dangerous products prohibited, etc.). ▪ Location where all display material, models and equipment will be shipped to and stored must be announced.
7 days prior to OEC	**Design Summary** ▪ A one page brief, detailed in Section 4.4.5 (Deliverables). **Layout and Specific Needs** Competitors must convey the following information to the Competition Lead: ▪ Any specific needs (layout, electrical, power supply, etc.) must be specified via Resource Request, detailed in Section 8.3.5 (Resource Request) . ▪ A sketch of the anticipated layout, including placement of the display board and any equipment or models. ▪ The planned shipping modes of displays or equipment including arrival time.
12 hours prior to OEC	**Set-up**

	- Competitors set up their displays the evening before the display. Compliance with the dimension constraints are checked this time. **Competition Briefing** - The Competition Lead will host a competition briefing, attended by the competitors and judges, where details of the competition timeline and judging structure are discussed. There will be time allowed for questions. - At the briefing, each team will be asked for a copy of their presentation handouts (Section 4.4.5)

5.4.2   Competition

5.4.2.1   Public Opening

The exhibitions are open for visits from the general public. Competitors must staff their displays for a minimum of 4 hours a day, including specified hours during judging periods. Judging periods are to be indicated during the competition briefing.

5.4.2.2   Judging

The judges, either individually or in groups of not more than three, will walk among the displays during the judging period. The competitors must give a 20-minute presentation, followed by a 10-minute question period, at their displays. They must use only the resources at their display to illustrate their work. Competitors will be required to give their presentation more than once as each judge must see all displays, but not at the same time.

5.4.3   Timekeeping

The following rules govern timekeeping:

- Time is not halted when a judge asks a question during the presentation.
- The remaining time must be indicated to the competitors ten (10) minutes, five (5) minutes, and one (1) minute before the end of the allotted time for the presentation.
- A visual countdown must be given during the last 30 seconds of the presentation.
- Presenters will be asked to stop their presentation if they exceed 20 minutes.
- Time to both ask and answer questions during the question period is counted.

5.4.4   Presentation Order

Presentation order will be chosen and presented at the competition briefing. The order will be selected at random, adhering to the following criteria:

- The judges may view the presentations either individually or in small groups of up to three people.
- Competitors will be required to give their presentation more than once.
- The order should allow all the judges to visit all the displays.
- The order shall prevent the judges from visiting the displays in the same order.

5.4.5   Deliverables

5.4.5.1   Design Summary

Prior to the competition, the team must submit a design summary. The purpose of this summary is for the judges and organizers to be prepared ahead of time with regard to the topics.

This summary will follow conventional formatting characteristics (12 point front, 1.5 line spacing, 1" paper margins) and is limited to one (1) page. The summary must include, but is not limited to:

- Team Name
- Team Members
- School and team A/B if applicable
- Design topic and description

5.4.5.2   Presentation Handouts

If a slideshow presentation is to be utilized, a hard copy of all slides must be prepared for each judge. The page layout must include 3 slides per page with space for notes.

5.5   Assessment and Judging

- The panel must comprise a minimum of five judges. There is no maximum number of judges.
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC.

5.5.1   Judging Matrix

Project	Design justification Economic feasibility Technical feasibility Environmental feasibility Innovation	70%
Presentation	Visual aids Speaker Quality Presentation Mechanics	25%
Design Summary		5%
Penalties		
Total		100%

5.5.2   Penalties

- For every minute the presentation excesses the time limit, 5 point deduction
- Competitor not available for start of presentation
- For every three grammar or spelling mistake, 1 point deduction
- Late submission of Design Summary, 5 point deduction

6 Junior Team Design

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

6.1 Junior Team Composition

The design teams must be comprised of a maximum of four competitors. At least half of the design team must be representing an undergraduate engineering program at an ESSCO-member school or OEC-Only ESSCO member school. The team must be entirely comprised of students who have not completed all 2nd year courses. All competitors and teams must also meet the requirements outlined in sections 1.1 Eligibility, 1.2 Qualification, and 1.3 Competitors.

6.2 Resources

6.2.1 Facilities Required

- 1 amphitheater (presentation of problem and team presentations)
- 1 large workroom, subdivided with partitions for each team or 1 separate workroom per team
- 1 centralized competition presentation/testing space (location will depend on the constraints of the design problem)
- Simultaneous translation equipment (if requested by competitors prior to OEC when judges are not bilingual).

6.2.2 Personnel Required

6.2.2.1   Judges

A minimum of five judges are required to assess the problem-solving abilities, efficacy of solutions 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 Lead

The Competition Lead is responsible, along with the VP Competitions, for the entire design and implementation of the Team Design competition. The Competition Lead must present the design problem at the beginning of the competition and answer any questions. Only the Competition Lead may answer questions during the design period. The Competition Lead 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 Supplied by OEC

The following equipment will be made available to all competitors during the design phase:

- A design area with at least one table, four chairs
- Any materials and/or tools specific to the design problem
- Power source if powered tools supplied

The following equipment will be available to teams during the presentation phase:

- 1 table
- Simultaneous translation equipment (if requested by competitors prior to OEC when judges are not bilingual).
- Whiteboard(s) or blackboard(s)

Each team member is allowed one computer.

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

6.2.4   Allowed External Resources

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

6.3   Procedure / Timeline

6.3.1   Pre-Competition

Information about the rules of the competition will be sent to all competitors. 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   Judges Briefing

At least half an hour before the competitors are given the 'Presentation of the Problem', the judges should be given the 'Presentation of the Problem', so that they can ask questions without taking time away from the competitors' 'Question Period'. This ensures that time can effectively be used to address judges concerns, which may be different than competitor concerns.

6.3.2.2   Presentation of Problem

The problem will be presented to all competitors and judges at the beginning of the competition, after the 'Judges Briefing' has occurred. The Competition Lead will provide detailed explanations of what is expected from the competitors, both orally and in writing.

6.3.2.3   Question Period

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

6.3.2.4   Development of the Solution

The teams will have 4-6 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 the deliverables must be submitted to the Competition Lead before the allotted time expires. Competitors may finish before the end of the allotted time.

6.3.2.5   Rest Period

Competitors must be allowed a minimum of two (2) hours to rest before the presentation and testing phase starts.

6.3.2.6   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 five (5) minutes to ask questions. The prototype will be available during the presentation.

Each team will then carry out a set number of tests of their design. The number and length of tests must be dictated by Competition Lead during the presentation of the problem. The testing may be carried out directly after each team's presentation or after all presentations are complete, at the discretion of the Competition Lead.

6.3.3   Timekeeping

- 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.
- 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 2 hours, 1 hour, 30 minutes, and 10 minutes before the end of the allotted time.
- The remaining presentation time must be indicated to the competitors 2 minutes and 1 minute before the end of the allotted time.

- A visual countdown must be given during the last 30 seconds of the presentation to the judges.

- After the 5 minute presentation time, the competitors will have a 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 to the judges commence. All teams are required to represent themselves at this announcement.

- Teams are not allowed to switch places in the presentation order.

6.3.5   Deliverables

6.3.5.1   From Competitors

Each team is required to submit a prototype of their design before the end of the design period. This design will be used to test the team's solution to the design problem.

No reports or presentation materials are required in the Junior Team Design competition. Teams may use visual aids in their presentations if they so desire. If team choose to use visual aids they must be submitted with the prototype at the end of the design period. All electronic files must be submitted using a USB Key. Emphasis should be placed on a clear explanation of the design and the functionality of the prototype. This is reflected in the judging criteria.

6.3.6   Response to Questions

- Only the Competition Lead may answer questions during the problem presentation and design phases. Volunteers and judges may not answer questions regarding rules or procedures at any time.

- During the presentation of the problem, the Competition Lead shall answer orally and write down the answers provided.

- During the design phase, only questions related to deliverable content shall be answered. No answers shall be provided in response to questions about the problem that might lead to the development of a new approach or that might invalidate a solution.

- During the design phase, answers to questions shall be provided in writing to all teams at the same time. A certain amount of time (e.g. 15 minutes) may be allowed to elapse or 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   Assessment and Judging

- The panel must have an odd number of judges.
- The panel must have at least five judges.
- The judges should be bilingual or the room equipped for simultaneous translation.
- The assessment shall be carried out in the audience's presence.
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC.

6.4.1   Judging Matrix

Design and Performance	40%
Teamwork	25%
Presentation	20%
Originality	15%
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.

7 Senior Team Design

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

7.1 Team Composition

The Senior Design team will be comprised of a maximum of four competitors. At least half of the design team must be representing an undergraduate engineering program at an ESSCO-member school or OEC-Only ESSCO member school. All competitors and teams must also meet the requirements outlined in sections 1.1 Eligibility, 1.2 Qualification, and 1.3 Competitors. The team must be entirely comprised of students of who have completed all 2nd year courses.

7.2 Resources

7.2.1 Facilities Required

- 1 amphitheater (presentation of problem and team presentations)
- 1 large workroom, subdivided with partitions for each team or 1 separate workroom per team
- 1 centralized competition presentation/testing space (location will depend on the constraints of the design problem)
- Simultaneous translation equipment (if requested by competitors prior to OEC when judges are not bilingual).

7.2.2 Personnel Required

7.2.2.1 Judges

A minimum of five judges are required to assess the problem-solving abilities, efficacy of solutions and team dynamics of the competitors. Judges in this category should have some technical engineering experience.

7.2.2.2 Competition Lead

The Competition Lead is responsible, along with the VP Competitions, for the design and implementation of the Senior Team Design competition. The Competition Lead must present the

design problem at the beginning of the competition and answer any questions. Only the Competition Lead may answer questions during the design period. The Competition Lead 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 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 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 design phase:

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

The following equipment will be available to teams during the presentation phase:

- 1 Digital projector
- 1 computer to load presentations
- 1 table
- Simultaneous translation equipment (if requested by competitors prior to OEC when judges are not bilingual).
- Whiteboard(s) or blackboard(s) or sheet paper

7.2.4   Allowed External Resources

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

- Any textbooks, course notes or other reference material.

- Digital Camera

- Each team member is allowed one computer.

- Any additional tools, equipment and/or software as deemed fit by the competition director so long as it is reasonable to expect all participants to have access to said tools, equipment and/or software.

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 (168 hours) 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.

7.3.2   Competition

7.3.2.1   Judges Briefing

At least half an hour before the competitors are given the 'Presentation of the Problem', the judges should be given the 'Presentation of the Problem', so that they can ask questions without taking time away from the competitors' 'Question Period'. This ensures that time can effectively be used to address judges concerns, which may be different than competitor concerns.

7.3.2.2   Presentation of Problem

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

7.3.2.3   Question Period

Competitors have fifteen (15) minutes to ask the Competition Lead any questions they may have. This takes place during 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.

7.3.2.4   Development of the Solution

The teams will have six to ten (6 - 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 the deliverables must be submitted to the Competition Lead before the allotted time expires. Competitors may finish before the end of the allotted time.

7.3.2.5   Rest Period

Competitors must be allowed a minimum of six hours to rest before the presentation phase starts.

7.3.2.6   Presentation and Tests

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 fifteen (15) minutes to ask questions.

Each team will carry out a test of their design (or an alternate number of tests specific to the design problem, at the discretion of the competition director). The testing may be carried out directly after each team's presentation or after all presentations are complete, at the discretion of the Competition Lead.

7.3.3   Timekeeping

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

During the problem presentation:

- Time is halted when a judge asks a question during the presentation of the problem. During the design phase:

- Time is started when all the teams have reached their work areas during development of the solution.
- The remaining time must be announced five (5) hours, one (1) hour, thirty (30) minutes, and ten (10) minutes before the end of the allotted time.

During the presentation and testing phase:

- 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 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 and publicly posted thirty (30) minutes before the presentations to the judges commence. All teams are required to represent themselves at this announcement.
- Teams are not allowed to switch places in the presentation order.

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.

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 Lead.

7.3.5.2 From Competitors

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 problem design package.

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.

7.3.6 Response to Questions

- Only the Competition Lead may answer questions during the problem presentation and design phases. Volunteers and judges may not answer questions regarding rules, competition interpretation or procedures at any time.
- During the presentation of the problem, the Competition Lead shall answer orally and write down the answers provided. The questions and answers will be distributed to all teams or posted in plain sight.
- During the design phase, only questions related to deliverable content shall be answered.

However, teams will be able to ask for clarifications of the rules which may invalidate a solution they are pursuing. Any and all rule clarifications will be recorded and distributed to all teams or posted in a conspicuous location as soon as they are answered. 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 five judges.
- The judges should be bilingual or the room equipped for simultaneous translation.
- The assessment shall be carried out in the audience's presence.
- Competition Leads will develop specific penalties for violations of rules, which will be provided to competitors in the competition briefing.
- Testing will be officially video-recorded to allow for fair resolution of any disputes.
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC.

7.4.1   Judging Matrix

Presentation	Design Process Design Justification Critique of the Design Critique of the Prototype Presentation Delivery	40%
Design Quality	Deliverable Compliance with Expectations Technical Innovation Consideration of Economic, Social and Environmental Impacts of Design Adherence to the Spirit of the Design Problem	20%
Testing		40%
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.

8 Re-Engineering

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

8.1 Team Composition

The Re-Engineering team will be comprised of a maximum of two competitors. The entire design team must be representing an undergraduate engineering program at an ESSCO-member school or OEC-Only ESSCO member school. All competitors and teams must also meet the requirements outlined in sections 1.1 Eligibility, 1.2 Qualification, and 1.3 Competitors.

8.2 Timeline/Procedure

8.2.1 Problem Presentation

The first case set will be distributed to the competitors one 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 briefing time for this distribution will be sufficient to allow for the reading of case set and to allow for questions to be addressed, but should not exceed one hour. Competitors will not be permitted to start working towards a solution during the briefing time period.

8.2.2 Judges Briefing

Judges should be briefed on the second part of the competition prior to the time where the second problem statement is presented to the competitors.

8.2.3 Case Structure

The competition will consist of two 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

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.

8.2.4   Question Period

After the cases have been read by the competitors, the remainder of the briefing time will be available for the competitors to ask questions of the Competition Lead.

8.2.5   Design Period

The competitors will be allowed a total of 8 working hours in order to work towards the solutions to their cases and prepare their required submission materials.

8.2.6   Addressing Questions

During the design period, competitors will be able to ask questions of the Competition Lead by emailing an identified email account. Answers to all collected questions will be emailed to all competitors, along with the questions which they address, every half hour from the start of the design time. The Competition Lead may elect to answer questions more often at any point in the competition.

8.2.7   Materials Provided

The following materials and resources will be provided to the competition competitors: A design room with at least a table and functioning power outlets; pens and paper; internet access.

8.2.8   Materials Allowed

Other supplementary materials and resources that competitors will be allowed to use include the following: two computers; USB storage; productivity software (i.e. Microsoft Office); an internet browser; any freely available internet sources; textbooks; class notes and materials; reference manuals.

8.2.9   Deliverables

The competitors will be required to write a report for each of the cases they complete as well as prepare one presentation to address both cases in front of the judges. Competitors can also opt to combine both solutions into one report of the combined length if they feel this format better conveys their solutions.

8.2.10 Submission

The two written reports and all presentation materials must be submitted immediately at the end of the design time. Submissions can be accepted either through emailing an identified email account or saving the files on a USB drive and physically handing it to the competition director. For the purposes of determining whether or not a submissions was submitted by the deadline: email submissions will be time-stamped against the receipt time reported by the receiving email server; physical submissions will be time-stamped against a time keeping device synced with the time-nw.nist.gov time reporting service.

8.3   Resources

8.3.1   Facilities Required

- 1 amphitheater (presentation of problem and team presentations)
- 1 workroom per team (design of solution, possibility the hotel room)
- Simultaneous translation equipment (if requested by competitors prior to OEC when judges are not bilingual)

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 Lead

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

- A design room with at least one table, four chairs
- A method to submit the team presentation
- Internet Connectivity
- Some information relevant to the design problem, at the discretion of the competition director

The following equipment will be available to teams during the presentation phase:

- 1 Digital projector
- 1 Computer containing the team's presentation file
- Simultaneous translation equipment if requested prior to OEC and the judges are not bilingual
- Whiteboard(s) or blackboard(s) or large pad of paper

8.3.4 Allowed External Resources

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

- Any background research conducted by team members prior to the competition
- Any electronic material stored on CDs, USB keys, disks or other storage devices

- o   Please check with the organizers to make sure the format of your electronic information will be accessible using the computers provided by OEC
- Any textbooks, course notes or other reference material
- Each team member is allowed one computer.
- A powerpoint clicker

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. Referencing must be done in APA format. 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 disqualified 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   Written Report

8.4.1   Content

Each of the written reports is to include the following information: what the proposed changes are; how the proposed changes meet the requirements laid out in the case description; the technical characteristics of the proposed changes; any calculations which relate to the prior three points.

8.4.2   Length

Each of the reports is not to exceed one page of double sided with a reasonable font size and margin limit; the minimum size for both attributes is 11pt font size and 2cm margins. 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 double-sided pages. The competitors may also elect to write a single report to address both solutions as long it is clear from the structure of the report where each solution is described and the document itself does not exceed two double-sided pages.

8.4.3   Appendix and Exhibits:

Any necessary appendices and exhibits will not count against the above length limitations. Any such included appendices and exhibits however should be clearly referenced in the main text of the report and should not embed an excessive amount of text.

8.4.4   Citation

All competitors are required to cite any outside sources on which the facts and statements in the report are based. Failure to cite all non-original statements will result in a penalty levied against the offending team.

8.5   Presentation

8.5.1   Content

The presentation should cover both of the 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.

8.5.2   Prohibited Content

In order to ensure that all competitors cease to work on the case solutions once the design time has ended, the competitors cannot include any material in their oral presentation which is not included within their submitted written reports or presentation materials.

8.5.3   Equipment Provided

The competitors will be provided with the following materials during their presentation: a computer; a projector; PowerPoint software; a whiteboard or a large pad of paper.

8.5.4   Allotted Time

Each team will be allotted 15 minutes for their presentation.

8.5.5   Question Period

Following the presentation, each team will be required to answer questions asked by the judges for a period which will not exceed 10 minutes.

8.5.6   Presentation Order

The presentation order will be selected randomly and will be announced 30 minutes before the first presentation is to take place. All teams must be present for the announcement of the presentation order. Teams will not be allowed to change their own presentation order.

8.6   Evaluation

8.6.1   Evaluation Rubric

Teams will be evaluated according to the following grading rubric:

	Case 1	Case 2
Solution	**65%**	
Feasibility	9%	8%
Technical details of proposed improvements	6%	4%
Can the principles be used for similar situations?	1%	1%
Innovation	4%	4%
Environmental Effects of Solution	12%	
Economic Effects of Solution	10%	
Social Impacts of Solution	6%	
Report	**15%**	
Report Organization	5%	
Writing Style	2%	
Content	8%	
Presentation	**20%**	
Confidence and Presence	3%	
Presentation Organization	5%	
Communication	5%	
Presentation of technical aspects (Visual supports, simplification of theories)	5%	
Question period long enough to properly clarify solutions	2%	
Insufficient Citation Penalty	**(-25%)**	
Document Received after deadline	**(-50%)**	

9 Programing

The goal of the programming category is to encourage engineering students to produce a piece of industry-quality software with all of the proper user and administrative documents. 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 to the most technically correct but the one that has the most real-world application and is most thoroughly thought out.

9.1   Team Composition

The Programming team will be comprised of a maximum of four competitors. At least half of the design team must be representing an undergraduate engineering program at an ESSCO-member school or OEC-Only ESSCO member school. All competitors and teams must also meet the requirements outlined in sections 1.1 Eligibility, 1.2 Qualification, and 1.3 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

- One (1) work area per team with the sufficient room for team meetings
- A large room with a projector and laptop to present final solutions to the given problem
- Simultaneous translation equipment (if requested prior to OEC and the judges are not bilingual)

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 Lead

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

9.3.2.2   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 teams during the design phase:

- A design room with at least one table, four chairs
- Internet Connectivity
- Information relevant to the design problem, at the discretion of the Competition Lead

The following equipment will be available to all teams during the presentation phase:

- 1 Digital projector
- 1 computer containing the team's presentation file
- Simultaneous translation equipment if judges are not bilingual (if requested prior to OEC)
- Whiteboard(s) or blackboard(s)

9.3.4   External Resources Allowed

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

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

9.3.5   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 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. The following is a list of recommended languages, IDE, text editor, database:

9.3.5.1   Recommended languages

- HTML/CSS
- Javascript
- JQuery
- PHP
- Ruby
- .NET(C#, VB, VBScript)
- Python
- Perl
- Actionscript
- Coffeescript
- C
- C++
- Objective C
- Java
- Scala
- Swift

- SQL

9.3.5.2   *IDE*

- JetBrains (IntelliJ, PyCharm, WebStrom etc)

- Eclipse

- NetBeans

- Microsoft Visual Studio

- XCode

- Android Studio

9.3.5.3   *Text Editors*

- Vim

- Sublime

- Brackets

- Atom

- KWrite

- TextEdit

9.3.5.4   *Servers*

- Oracle

- IBM DB2

- Microsoft SQL server

- Microsoft Access

- MySQL

- PostgreSQL

- MongoDB

9.3.5.5   *Other Tools*

- ReactJS

- MeteorJS

- Bootstrap

- Flask

- MEAN Stack

- Digital Ocean

- Heroku
- Microsoft Azure
- Amazon Web Services
- Ionic
- Cordova

If there is something that a competitor wishes to use during the competition and it is not mentioned above notify the Competition Lead during the question period.

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

9.4   Procedure/Timeline

9.4.1   Pre-Competition

At least seven days (168 hours) prior to the competition, the main theme(s) of the competition will be announced to the competitors, judges and public. 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 Lead 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 Lead any questions. Only the time used to ask the questions (not the answers) should be counted in the 15 minutes. Time used by judges to pose questions will not be counted.

Competitors then have 15 minutes to ask the judges any questions. For example: Does it matter if we use a MySQL or PostgreSQL database? Only the time used to ask the questions (not the answers) should be counted in the 15 minutes.

9.4.2.3   Solution development

Teams will be given 5-8 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. Competitors may finish before the end of the allotted time.

9.4.2.4   Rest period

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

9.4.2.5   Solution Presentations

Competitors will have a maximum of 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 10 minutes to ask questions. Judges can ask a question at anytime during the presentation. The clock should be stopped during these interruptions.

9.4.3 Timekeeping

The following rules must be adhered to by the official timekeeper.

9.4.3.1   During the design phase

- Time is started when the teams arrive at their respective workstations.
- The time remaining in the competition must be announced 2 hours, 1 hour, 30 minutes, 15 minutes and 5 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 timer will be provided during the presentation that can be viewed by both the judges and the team presenting

9.4.4 Presentation order

- Presentation order shall be determined randomly.
- Presentation order shall be announced two hours 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, unless there is an emergency. If an emergency arises the competition director must be notified as soon as possible.

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 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.

Each team will receive: a GitHub repository link that will contain, a package outlining the problem definition, design and presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Lead on the day of the competition. The team members are only allowed to download/clone the repository to their personal laptops, they are not allowed to fork the repository.

A hard copy of the package outlining the problem definition, design and presentation requirements, rules, marking scheme and any other information deemed necessary by the Competition Lead on the day of the competition will also be provided.

9.4.5.2 From competitors

The team members are required to push any progress made while developing the solution to the problem to the same GitHub repository link every hour. After every push made to GitHub the Competition Lead will automatically be notified via email.

Any attempt to push additional code to the GitHub repository will be considered a violation of the rules and will result in an automatic disqualification from the competition. In addition, their respective schools will also be notified.

The presentation for the teams proposed solution, must be submitted to devpost and also pushed to GitHub as a PDF before the end of the design period. There are no specific requirements for the Powerpoint, Keynote etc, as judges will focus primarily on quality of code and the solution. The Powerpoint, Keynote etc, are purely a visual and organizational aid during the presentation.

The team is allowed to use their own computer to present. However, the team is required to only use the downloaded files from devpost. The Competition Lead will observe the download process to ensure fair judging for all teams. The Competition Lead is also required to observe the process the

competing team uses to run their software to ensure that the team only uses the files downloaded from their devpost submission and not any other files.

9.4.6   Response to Questions

- Only the Competition Lead may answer questions during the problem presentation and design phases. Volunteers and judges may not answer questions regarding rules and procedures at any time.
- During the presentation of the problem, the Competition Lead shall answer orally and write down the answers provided.
- During the design phase, only questions related to deliverable content shall be answered. No answers shall be provided in response to questions about the problem that might lead to the development of a new approach or which might invalidate a solution.
- During the design phase, answers to questions shall be provided in writing to all teams at the same time. 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 judges should be bilingual or the room equipped for simultaneous translation (if requested prior to OEC).
- The presentations shall be carried out without an audience.
- Feedback forms shall be provided to each team following the announcement of winners but prior to the end of OEC.

9.5.1   Judging Matrix

Solution	- Quality of code (understand of code) - Completeness (Testing, bugs, QA) - Project documentation	50%
Report	- Solution Relevance - Report Design - Consideration of Stakeholders - Problem solution and identification	25%
Presentation	- Content - Professionalism - Answers to Questions from Judges	25%
Competition Misconduct	- Failure to follow rules - Not all group members speak in presentation - Late submission - Plagiarism - Presentation Over Time - Code Does not Compile or Run	Varying Penalties of 10-100% Deduction Based on Type of Misconduct
TOTAL		100%