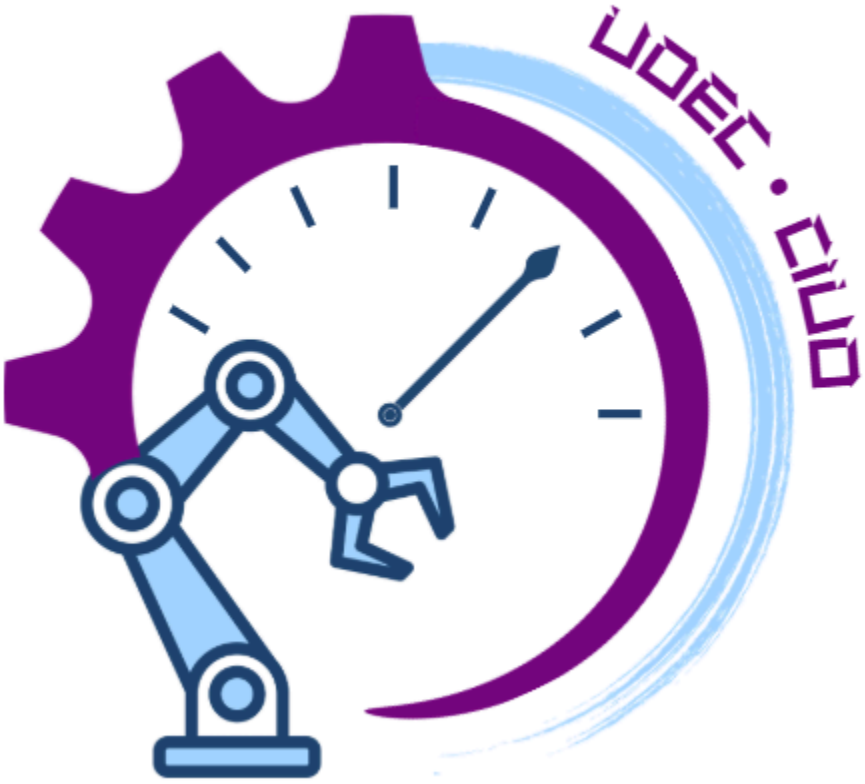


university of OTTAWA

ENGINEERING COMPETITION

Senior Design Competition 2026

uOttawa Engineering Students' Society

VP Internal

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This document outlines requirements and expectations for competitors in the Senior Design category at uOEC 2026. Please read this document carefully and in full.

Overview

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. Prototypes must be designed and entirely built during the build period.
Senior Design differs from the other design categories as participants are expected to have more knowledge and experience considering they are 3rd/4th year engineering students.

Scenario

Throughout your time-travelling journey, you and your crewmates time travel back to ancient Rome, straight into the Colosseum. Thousands gather to watch, but your time machine has crash-landed and the parts you need are scattered across the arena. You must build a robot that can cross the hostile arena to recover them: weaving past obstacles, docking precisely, and clearing debris. Your robot must be strategically designed to complete the course quickly and reliably without creating an unsafe situation.

Objective

- You must build a remote-controlled robot.
    - The robot should be functional, and should be able to complete basic maneuvers.
        - Basic maneuvers involve:
            - Moving a box from one point to another.
            - Being able to be controlled smoothly.
            - etc…
- Material Usage Requirement: Use at least 50% of the supplies given: Teams must use at least 50% of the total component value provided to them at the start of the competition.
    - This does not include fasteners, ties, tape, and consumable material; everything else on the list is included.
    - Teams are free to use all 100% of the materials given.
    - Calculating the component value will be by taking each component's material value and adding them all up, the sum of those values must be greater than or equal to 50% of the total material value of the kit.

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Rules and Constraints

Safety Restrictions:

- Sharp edges, projectiles, hazardous material, or any material that could harm or injure anyone is strictly forbidden**.**
- Electrical components and batteries must be concealed and not exposed.
    - There should be no bare wires exposed in the design, meaning if any conductive metal part of a wire should be wrapped with electrical tape.
- Teams are strictly prohibited from intentionally targeting any persons.
- The use of material that is not provided by the uOEC competition is forbidden.
- Using the robot outside of the testing and presentation area is forbidden as it could be a tripping hazard and it may harm others.
- Teams cannot bring personal repair materials such as tape, zip ties, or wires, since the materials will be provided.

Constraints:

- The maximum number of individuals for a Senior Design team is four (4).
- Each team member is allowed one (1) computer.
- Maximum length, width, and height is 30 centimetres.
    - Including wheels.
    - Should robot arms exist: Arms of the robot do not contribute to this limitation.
        - Maximum arm length is 20 centimeters per arm.
- The robot weight must be under 3kg.
    - Robots will be weighed on a scale.

Durations

- The time to build and assemble the robot is 5 hours.
    - The 5 hour build time is from 8:30 AM to 2:30 PM, paused between 12:00 and 1:00pm for lunch.
    - Within this time teams must also create a presentation about their robot explaining why they chose the particular design, and what the design process looked like. Abstract and presentation file due at 2:30pm.
- The judging time for this competition is 2 hours including presentation and testing time.
    - Presentations and testing: 2:30 to 4:30 pm. Each team: ten (10) minute presentation, five (5) minutes of questions, then a three (3) minute scored test (see Testing).

Deliverables

The team must submit a presentation abstract before the start of the presentation period. The purpose of this abstract is to brief judges and organizers on the topic the team will be presenting.

The abstract must:

a. Be a maximum of two hundred (200) words;
   i. As there is a word cap, formatting is at the discretion of the team.
b. Describe the presentation topic;
c. State the competitor's name(s); and
d. Include the team's alias.
   Write the abstract around the general design approach of the robot.

The list of deliverables is:

- Presentation abstract.
- Presentation about the design process/robot.
- The robot built in this competition.

A soft copy (Digital) of the team's presentation must be submitted. A hard copy (Physical) is not needed.

Resources

- Competitors are permitted to access the internet on their devices.
- The competitors are allowed to bring the following equipment with them during the Competition phase:
    a. Any background research conducted by team members prior to the competition;
        i. Code
        ii. Circuit diagrams
        iii. CAD
        iv. Design concepts
    b. Any textbooks, course notes, or other reference material;
    c. Each team member is allowed one device*; and
    d. Camera.

  * Devices may include a computer, iPad, tablet, or other electronics of similar nature. A competitor may have multiple devices present but is only permitted to use one (1) at a time. For example, a competitor may use a laptop for research and switch to using an iPad to sketch their design, etc.

- Teams are permitted to bring a slideshow template for use in the competition.
- Templates may contain background images and a basic slide layout.

No external tools can be brought by competitors, only tools provided by the competition may be used.

Judging and Scoring

For your reference, the judging matrix is provided below.

Design Quality	Aesthetics	/ 10
	Creativity and Innovation	/ 20
	Code	/ 20
	Overall Design	/ 10
Testing	Overall Ability to Function as Intended	/ 10
Presentation	Design Process and Justification	/ 30
	Articulation and Timing	
	Visual Aids	
	Response to Questions	
Penalties	Plagiarism	-50
	Insufficient Citation	-50
	Documents Received After Deadline	-50
	Absent Team Member	-25
	Verbal Disclosure of School During Presentation	-10
	Disclosure of School in Presentation Files/Documents	-10
	Disclosure of School by Supporting Audience Members	-10
Total		/ 100

Testing 10 Marks

- The robot is functioning and can move as intended: 10 points
    - The robot can perform basic tasks such as:
        - Move a box from one point to another.
        - Being able to be controlled smoothly.

Code 20 Marks

- Judges are looking for neat and well commented code.
- The team’s code must be organized and easy to read or understand by programmers.
- The team's code must handle edge-cases.

Remember to familiarize yourself with the rulebook for more details on what is expected, and reach out to the VP Internal for any questions.

Useful Resources

Documentation of Arduino Uno
https://docs.arduino.cc/hardware/uno-rev3/
How to download Arduino IDE

https://www.youtube.com/watch?v=E5Ve6NSSmfE
Download link Arduino IDE
https://www.arduino.cc/en/software/

Materials

- Electronic components (Arduino, motors, motor driver, battery, transmitter/receiver) may not be modified, cut, soldered, drilled, or altered. The chassis sheet may be cut and shaped using the provided tools, and consumables (tape, zip ties, jumper wires) may be cut to length.
- The listed materials are provided per team and are NOT shared with other teams.

Materials:	
Name of Item:	Quantity:
Arduino Uno	1
2.4 GHz Transmitter + Receiver (4 channel)	1
Geared Motor + Wheel Set (TT style)	4
Motor Driver (L298N)	1
Rechargeable Battery Pack (7.2 V NiMH)	1
Battery Connector Lead	1
Chassis Sheet	1
Jumper Wires	1
Electrical Tape + Zip Ties	1
USB A-to-B Cable	1
Small Flat Screwdriver	1
Scissors	1

Shared Materials:	
Name of Item:	Quantity:
Battery Chargers (One Per 3 Teams)	4
Digital Scale	1
Measuring Tape	1
Spare Battery Packs	2
Spare Motor Drivers	2
Repair Station Spares: Jumpers Wires, Tape, Zip Ties	1
Wire Strippers	2
USB Charger Adapter	4
Multimeter	1