



2021 B.C. SKILLS COMPETITION – SCOPE DOCUMENT

CHECK IN TIME: **8:00**

CONTEST START: **9:00**

VIRTUAL ELECTRONICS Secondary

PURPOSE OF THE CHALLENGE

DURATION: 6 HOURS

- To make the youth of BC aware that there are interesting and rewarding careers as Electronics Technicians and Technologists and in fields that are closely related to electronics such as computing, automation and instrumentation.
- To evaluate each competitor's skills and to recognize outstanding students for excellence and professionalism in the field of Electronics Technology.

SKILLS AND KNOWLEDGE TO BE TESTED

The competition is based on practical assignments (80 %) with the remainder (20%) on purely theoretical assignments.

The contest will cover the theoretical and practical aspects of current state of the art electronic industry standards. The competitor **may** be asked to demonstrate abilities in the following areas:

- Interpreting electronic schematic diagrams, pictorials, and technical specifications.
- Identifying common electrical and electronic components.
- Constructing and analysing DC circuits including series resistance, parallel resistance and series-parallel resistance circuits.
- Constructing and analysing AC circuits including capacitive, inductive and complex RLC circuits.
- Constructing, analysing and troubleshooting operational amplifiers such as LM741, timers such as LM555, comparators such as the LM311 and voltage regulators such as LM7805.
- Constructing, analysing and troubleshooting digital circuits from the TTL and CMOS families such as AND, OR, NAND, NOR gates, inverters, Flip-flops, Counters, Shift Registers, Encoders, Decoders and 7 Segment Displays.
- Hand soldering components on a printed circuit board to acceptable industry standards.
- Hand de-soldering from printed circuit boards to acceptable industry standards.
- Installing cable connectors.
- Setting-up and demonstrating the use of common electronic measuring equipment including digital multimeter, power supply, function generator, frequency counter and oscilloscope.
- Troubleshooting simple electronic circuits having a preinstalled fault.
- Reverse Engineering a simple electronic circuit.
- Use Multisim Live to build schematics and simulate circuits.

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EQUIPMENT, TOOLS, SUPPLIES, CLOTHING

Clothing Requirements:

- Competitors are to be dressed in a clean and safe manner that meets industry standards. Competitors may be asked to remove jewellery that the judges consider to be unsafe.
- Competitors wishing to block out some of the noise from other competitions may use hearing protectors.
- Competitors will be allowed to use a personal entertainment devices such as CD or MP3 players during some sessions of the competition. The sessions during which the entertainment devices may be used will be determined by the judge(s).
- **Cellular telephones must be in Airplane Mode.**

Provided by the Organization

- Projects and Documentation:
To comply with the recommendations made by the National Technical Committee, the project **documentation** will be released only at the competition. **Project** will be shipped to competitor's proctor.

Provided by the Proctor

- Zoom-capable computer
- Camera capable of taking high resolution pictures of the assembled circuit board and breadboard, and documentation (pictures to then be sent to the judges electronically).

Provided by the Competitor

- Bench equipment: Dual Power Supply 0 to +/- 15 Volts @ 1 amp
Digital Multimeter
- Hand Tools: 25 to 35 watt soldering iron, soldering iron stand, tips of choice and tip cleaner. Butane soldering devices will **not** be allowed. Flux remover will **not** be permitted.
Hand vacuum solder extractor, or Solder Wick
Long (needle) nose pliers
Side (Diagonal) Cutters
Wire Stripper
Screwdrivers
"Third Hand", or similar, bench vice – including magnifying glass
Lead Free Solder
- Miscellaneous: Pens, Pencils, Eraser, Ruler
Calculator - The judges will inspect the calculator for suitability. Programmable calculators may be reset if the judges believe the owner will have an unfair disadvantage over other competitors.
Safety Glasses/Goggles
2 breadboards, minimum size each, 2"x 6". Pre-cut or pre-bent wires **will not** be permitted (wire will be supplied)
Test leads with mini-alligator to mini-alligator clips and banana to alligator clips
Power bar with 4 or more outlets - **Must be CSA approved**

Desk Lamp (optional)

Each competitor is required to supply the aforementioned tools and supplies. Failure to comply with this requirement MAY result in the competitor not being allowed to participate.

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POINT BREAKDOWN / 100 TOTAL

Competitors will be marked objectively in the following areas:

| | |
|------------------------------|-----|
| Project assembly and testing | 40% |
| Breadboarding technique | 35% |
| Circuit analysis | 25% |

Please note that there will **NOT** be a separate theory exam. Each assigned task will have a series of questions, worth 15 % of the total mark, to be answered.

ADDITIONAL COMPETITION NOTES:

Marks for each section of the competition will be calculated to two (2) decimal places.

- In the event of a tie in the evaluation, the tie will be broken by the mark achieved on the following project sections:
 1. Project assembly and testing
 2. Circuit Analysis
- Competition documents will be available to the competitor **only** at the time of competition. **Proctor to collect competition documents at end of competition.**
- Safety glasses **must** be worn during wiring, soldering and rework sessions. Failure to comply with this requirement may lead to disqualification.
- Programmable calculators may be reset if the judges believe the owner will have an unfair disadvantage over other competitors.
- Butane soldering irons **will not** be permitted. Flux remover **will not** be permitted.
- Pre-cut or pre-formed wires **will not** be permitted

Standards used at the International Competitions may be of interest to competitors. See the trade 16 scope and documents at:
www.worldskills.com

TECHNICAL COMMITTEE MEMBERS – JUDGES

Des Hart
Lee Woldanski

BC Technical Committee Chair, Judge
BC Technical Committee Member, Judge

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