SCNC
SKILLS CANADA
NATIONAL
COMPETITION

OCMT
OLYMPIADES
CANADIENNES
DES MÉTIERS
ET DES
TECHNOLOGIES

Skills Compétences Canada
Halifax 2019

CONTEST DESCRIPTION / DESCRIPTION DE CONCOURS

ELECTRONICS
ÉLECTRONIQUE

POST- SECONDARY / NIVEAU POSTSECONDAIRE

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1 THE IMPORTANCE OF ESSENTIAL SKILLS FOR CAREERS IN THE SKILLED TRADES AND TECHNOLOGY

SCC is currently working with Employment and Social Development Canada (ESDC) in order to bring awareness to the importance of Essential Skills that are absolutely crucial for success in the workforce. This is part of an ongoing initiative that requires the integration and identification of Essential Skills in contest descriptions, projects, and project documents. Essential skills are used in nearly every job and at different levels of complexity. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change. Good Essential Skills means you will understand and remember concepts introduced in technical training. The level of Essential Skills required for most trades is as high or higher than it is for many office jobs.

The following 9 skills have been identified and validated as key essential skills for the workplace in the legend below:
[1]Numeracy, [2]Oral Communication, [3]Working with Others, [4]Continuous Learning, [5]Reading Text, [6]Writing, [7]Thinking, [8]Document Use, [9]Digital, [10]Technical

These essential skills have been identified with in section 2.3 and/or 3.2 of your Contest Description. The top three Essential Skills for your area of competition have been identified on your Project and all other supporting project documents.

2 CONTEST INTRODUCTION

2.1 Purpose of the Challenge

To evaluate each competitor's skills and to recognize outstanding students for excellence and professionalism in the field of Electronics Technology.
http://skillscompetencescanada.com/en/skills/information-technology/electronics/

2.2 Duration of contest.

12 hours

2.3 Skills and Knowledge to be tested.

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:

2.4 Interpret electronic schematic diagrams, pictorials, manufacturers technical specifications and suppliers' web sites.[8]

- Identify common electrical and electronic components.
- Construct, analyse and troubleshoot 7 DC circuits including series resistance, parallel resistance, series-parallel resistance and switching circuits.7

- Construct, analyse and troubleshoot 7 AC circuits including capacitive, inductive and complex RLC circuits.
- Construct, analyse and troubleshoot analog circuits including discrete amplifiers, operational amplifiers and comparator circuits. 7
- Construct, analyse and troubleshoot 7 digital circuits including TTL/CMOS gates, timers and optical devices.
- Apply the appropriate test equipment to a given situation7
- Interpret the observed values from the test equipment. (AC/DC voltages, currents and waveforms and circuit resistance)1
- Identify basic systems of analog to digital and digital to analog conversion1
- Interface to a microcontroller
- Program a microcontroller
- Use of electronic design and simulation software9.

Essential Skills – 1Numeracy 4Continuous Learning 5Reading Text 6Writing 7Thinking (Critical Thinking) 8Document Use 9Digital

3 CONTEST DESCRIPTION

3.1 List of documents produced and timeline for when competitors have access to the documents.

DOCUMENT	DATE OF DISTRIBUTION VIA WEBSITE
Schedule	January, 2019
Component Data Sheets	January, 2019
Additional Notes	January, 2019
Judging Criteria	January, 2019

3.2 Tasks that may be performed during the contest

- Hand - solder through-hole and/or surface mount components on a printed circuit board to acceptable industry standards.
- Hand – de-solder through-hole and/or surface mount components on a printed circuit board.
- Assemble a circuit from a kit of parts PCB
- Assemble a circuit from a kit of components on a breadboard.
- Set-up and demonstrate use of common electronic measuring equipment including multimeters, power supplies, frequency generators and oscilloscopes.
- Troubleshoot simple electronic circuits having a preinstalled fault and restore to a working order.
- Reverse engineer a simple electronic circuit.
- Capture a given schematic and layout a PCB using through-hole and/or surface mount footprints using electronic CAD.

- Design, breadboard and test electronic circuits that: Amplify and condition signals from common sensors, control low power loads such as small motors, LEDs, speakers, process inputs and provide desired outputs program and interface a microcontroller to typically encountered devices e.g. switches, keypads, leds, SPI/I2C devices
  EQUIPMENT, MATERIAL, CLOTHING

4 EQUIPMENT, MATERIAL, CLOTHING

4.1 quipment and material provided by Skills/Compétences Canada

- Fluke Scopemeter c/w accessories (minimum 40MHz)
- Fluke Digital Multimeter c/w test leads and temperature probe
- Triple Power Supply fixed 5V@.5amp,0 to +/- 15 Volts @ 1 amp c/w leads and clips
- Waveform Generator c/w BNC to alligator cables
- Lead free Solder will be supplied. Please consult the additional notes for exact type.
- Project wire
- Additional equipment specific to the competition
- Projects, electronic components and documentation
- Desolder braid. Consult the additional notes for the exact type.
- Computers with associated software

4.2 Equipment and material provided by the competitor

- Solder Iron suitable for use with lead free solder. Stand, Tip cleaner, tips of choice. (Both Post-Secondary and Secondary competitors) Butane solder devices will not be allowed.
- Hand vacuum solder extractor
- Three sets of test leads (banana jack with alligator clips)
- Surface mount solder and de-solder station.
- Long nose pliers
- Side Cutters
- Wire Stripper
- Screwdrivers (including precision set)
- “Third Hand” including magnifying glass. (optional)
- Magnifier
- Power bar, 4 or more outlet (3’/1m or more cord length and must be CSA approved
- Pens, Pencils, Eraser, Ruler
- Safety Glasses with side shields or Goggles
- 2 breadboards, minimum size each, 2”x 6” (wire will be supplied)
- Desk Lamp

- Stand-alone calculator Non-Programmable. Example TI-30Xa
- Stand alone personal music player during some sessions of the competition. The sessions where music is allowed will be determined by the judges.
- Safety glasses with side shields or goggles must be worn when soldering, de-soldering and circuit assembly. Failure to comply with this regulation may result in disqualification from the competition at the discretion of the NTC members on site.
- Electronic CAD software capable of generating gerber files. Competitors will use Autodesk Eagle. The competitor must use an evaluation version for the competition and must download and install their evaluation version during the competition. If a competitor wishes to use an alternate circuit CAD program they must obtain approval from the NTC judges. Any alternate circuit CAD must be a trial version. It is the responsibility of each competitor to supply the aforementioned tools and supplies. Failure to supply the required tools and supplies may result in competitor not being allowed to participate.

COMPETITORS WILL BE REQUIRED TO USE THE MATERIAL AND EQUIPMENT PROVIDED BY SCC. ALL OTHER MATERIAL AND EQUIPMENT WILL BE REMOVED FROM THE SKILL AREA.

4.3 Required clothing provided by the competitor

- Competitors are to be dressed in a clean and safe manner (long pants and closed toe shoes)
- No jewellery on hands or wrists.

5 SAFETY REQUIREMENTS

5.1 Safety workshop

Upon arrival at the Skill area, Competitors will participate in a Safety workshop and they will be expected to work and maintain a safe working area during the competition. Any Competitor breaking any health, safety and environmental rules, may be required to undertake a second safety workshop, this will not affect the Competitor's competition time.

5.2 Personal protective equipment (PPE) provided by Skills/Compétences Canada

- N/A

5.3 List of required personal protective equipment (PPE) provided by competitors

- Safety Glasses with side shields or goggles

6 ASSESSMENT

6.1 Point breakdown

POINT BREAKDOWN	/100
Design and Construction	20
Schematic entry and PCB	20
Assembly and Testing	20
Programming	20
Fault Finding and Measurement	20

7 CONTEST SPECIFIC RULES

Contest specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from contest to contest. Any additional contest rules will be reviewed during competitor orientation.

TOPIC/TASK	CONTEST SPECIFIC RULE
Safety	Competitors must wear their safety glasses with side shields or goggles when soldering, de-soldering and circuit assembly. Failure to comply with this regulation may result in disqualification from the competition at the discretion of the National Technical Committee (NTC) members on site.
Use of technology - music	Competitors are allowed to listen to music through headphones or earbuds but must be provided by a non-cellular network. The sessions where music is allowed will be determined by the NTC.
Tools/ Infrastructure	Competitors are responsible to supply the aforementioned tools and supplies. Failure to bring the required tools and supplies may result in competitor not being allowed to participate.

8 ADDITIONAL INFORMATION

8.1 Interpreter

If a competitor requires the help of an interpreter once onsite during the competition, the Skills/Compétences Canada Provincial/Territorial offices must advise Skills/Compétences Canada National Secretariat a minimum of 1 month prior to the competition or this service might not be guaranteed.

8.2 Ties

- Tiebreaker #1: In the event of a tie, the competitor with the highest mark in the Design criteria will be declared the winner.
- Tiebreaker #2: If a tie still exists, the competitor with the highest mark in the Assembly and Testing criteria will be declared the winner.

- Tiebreaker #3: In the event of a third tie, the competitor with the highest mark in the Programming criteria will be declared the winner.

8.3 Test Project change at the Competition

Where the Test Project has been circulated to Competitors in advance, NTC shall change a maximum of 30% of the work content. Please refer to the Competition Rules.

8.4 Competition rules

Refer to the competition rules of the Skills Canada National Competition which can be found on our website.

9 NATIONAL TECHNICAL COMMITTEE MEMBERS

Member Organization	Name
Saskatchewan	Satindar Nijhawan
Ontario – Chair	Paul Cianflone
Manitoba	Joe Bettencourt
British Columbia	Des Hart
National Secretariat representative	Rudy Hofer

Contact the Skills/Compétences Canada National Secretariat for any questions or concerns: Nathalie Maisonneuve (nathaliem@skillscanada.com).