



The International Vocational Training Organisation IVTO determine, by decision of the General Assembly and in accordance with the Constitution, the Standing Orders and the Competition Rules, the following minimum requirements for trade No. 4.

1. Name and description of the trade

1.1 The name of the trade is Mechatronics (D=Mechatronik, F=Mécatronique)

1.2. The theoretical and practical training of the mechatronics technician is concerned with the mechanical, hydraulic, pneumatic and electronic equipment in a manufacturing or assembly plant.

1.3 The mechatronics technician works mainly in manufacturing or assembly plant in the design, installation, commissioning and maintenance of software-driven, electronically-controlled equipment.

2. Scope of work at the IVTC

2.1

The competitors must be able to

- to solve logic problems
- to carry out system design
- to assemble a machine according to documentation
- to design a program for controlling a machine
- to connect a machine to its control system
- to commission the machine to carry out its correct function to solve a series of practical operational problems as set by the experts
- to document procedures carried out
- interpret appropriate forms of technical documentation (e.g. circuits, displacement-step diagram)
- design electrical and pneumatic circuits by hand or by using commercially available software

2.2

There will be two competitors per team. The competition includes team and individual events. The expert team recommends that competitors are not to exceed 22 years of age in the year of the competition. The ruling for 2001 will be decided and announced by the Technical Committee.

3. Practical Work

3.1.

Design/Assembly

The project is to be designed and assembled using the industrial components in accordance with the instructions and documentation. The speed of assembly of known stations will not be a criteria. The assessment of the quality of assembly must reflect industrial standards.

3.2 Connection

Connections are to be made according to instructions and documentation to ensure correct function of the machine. Any circuit diagrams necessary for successful completion of the project are to be included.

3.3 Commissioning

The machine must be made to function in accordance with the instructions and documentation. No deliberate faults are to be introduced.

3.4 Troubleshooting

There may be a series of multiple problem troubleshooting sections which will draw on a prepared set of faults, preferably with computer-generated random selection immediately prior to their use.



3.5 Information Technology

Tasks must be included to test the competitors' ability to carry out system programming. Documentation produced by competitors and communication may also be included.

4. Theoretical knowledge

4.1 Mechanical design

An ability to understand and design mechanical systems. This must include a knowledge of pneumatic and hydraulic systems, their standards and their documentation.

4.2 Circuit design

The ability to understand and design electrical circuits in machine/controller systems.

4.3 Digital Logic

An understanding of the configuration of the digital controller and how a software program relates to a machine action.

4.4. Software programming

The ability to write programs to control a machine. This relates to the personal computer and to any industrial programmable logic controller.

4.5. Analytical Techniques

They must master problem solving techniques.

5. Test project materials

A general description of the test work, including sample of competition schedule is included in the appendix for the jury.

5.2 Material

A number of programmable logic controllers per team as specified by the project team. Specifications are to be emailed at least 6 months before the competition.

5.3

Pre-competition on-site training to be a maximum of 8 hours.

5.4

The total working time for the project will be between 18 and 22 hours

6. Workshop installations

6.1

The work area should provide enough space to work in teams of two with the usual facilities for experts, material and tool storage. The layout should be designed for public access and maintain equal exposure of visitors to each competing team. The competitors' area must be at least 1.5 metres from the visitor barrier.

6.2

A soundproof conference room for experts must be provided for up to 25 people and have photocopier facilities.

6.3

The competitors' work area dimension is to be a minimum of 5 x 3 metres (see appendix 1 for layout). Equipment store in addition to the competitors' work areas and administration section needs to be centrally located (dimensions 3 x 3 m).

6.4 Work station

Stand for equipment plus working surface

At least a Pentium PC with standard English operating system and printing facilities for each workstation

A further system must be provides for experts

Tools for competitors

Any commercially available tools may be used. This is subject to approval by the Safety Officer.

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Trade Description for Seoul 2001
Trade 4 Mechatronics
11 to 14 November 1999



7.7

Competitors must supply their own tools
Competitors must bring all software required for the PLC they have selected.
It is the responsibility of their expert to check software compatibility. The team is responsible for the provision connectors, adapters, plugs, interfaces suitable for the host country.

6.5 Safety

Work clothes must comply with relevant codes.
A first aid kit must be available throughout the competition.

7. Test project and marking

7.1

All documentation presented must be available in digital form.

7.2

There is to be a majority agreement (minimum = 50% + 1) on the accepted competition marking scale.

7.3

Selection of appropriate projects based on 7.2

7.4. Results may be displayed in the competition area.

7.5

All marking will be objective in accordance with the marking scale. Only Form 6 will be required for the submission of marks

Marking is designed to be progressive and a program has been written for computer calculation after time and task data has been entered.

A sample marking scale and instructions for juries from the Mechatronic previous competition are to be attached to the Trade Description. The expert team may make modifications to the project.

Experts are to complete a Score Sheet for each section and team.

7.8 Rating

Item

Design/Assembly	15
Commissioning	20
Programming	35
Troubleshooting	30

7.9

Conversion from 100 to the 400 to 600 scale will be computerised.

Signed

15.11. 1999

The Expert Team Montreal 1999