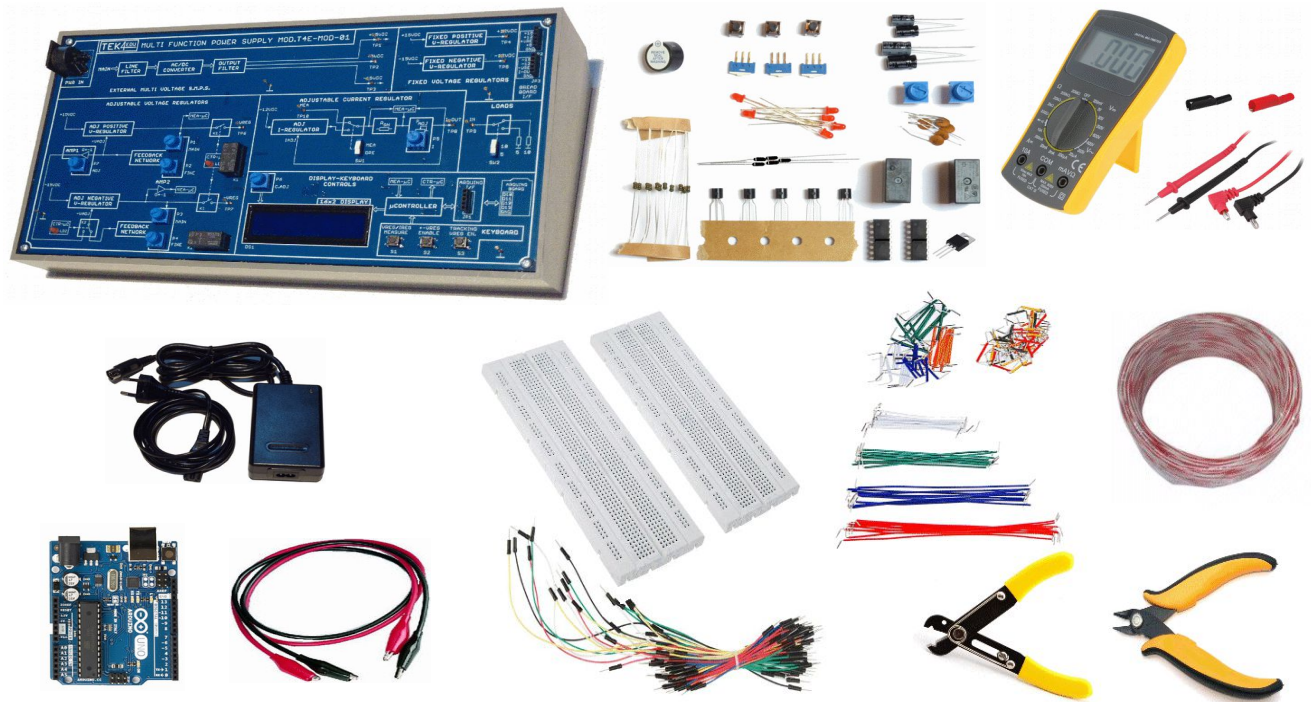


# myLAB MOD. T4E-LAB-01

Laboratory  
Equipment



### COURSE PROGRAM (cont.1)

**myLAB mod.T4E-LAB-01** is a complete solution to set up the laboratory in which you will want to perform experiments of electricity and electronics, making circuits and prototypes.

The solution is designed to allow the learning of basic electronics, the use of electronic components and **Arduino UNO** board, and the code programming (**sketch**). To enable Students to build, assemble and wire electric and electronic prototypes, **myLAB** includes all the accessories and tools needed to complete the lab and make it standalone:

- 1 Power Supply Trainer
- 1 Arduino UNO board
- 1 digital multimeter
- various electrical and electronic components, integrated circuits, terminated and not terminated cables, and tools for preparation of cables.

Particularly, the Power Supply Trainer can be connected to the Arduino UNO board to allow Students to:

- Analyzing the code contained in its  $\mu C$ , edit and
- Upload it from PC to  $\mu C$  to evaluate their effects.

All these components are compatible with each other and **myLAB**, including more experiment manuals, does not need another!

### COURSE PROGRAM

Power supply: Switching (S.M.P.S.) and linear mode  
Voltage regulator: fixed and adjustable, positive and negative polarity

Dual voltage regulator:

- double polarity: positive and negative
- independent control for each polarity
- tracking control: unique setting for both positive and negative polarity

Current regulator:

- constant current regulation

- modification of the shunt resistor
  - Effect on the load: increase of the output voltage with increasing load resistance
  - Use as charge controller or battery charger
- Typical characteristics of power supply unit:
- display, keyboard and output controls
  - microcontroller to allow voltage and current measurements
- Use of power supply unit with experimental circuits  
Cabling of power supply unit to breadboards and Arduino UNO board  
Preparing standard wiring with stripper and plier to be used with breadboard  
Conversion AWG to mm standard  
Knowledge and use of breadboard:
- use of power rails
  - power the breadboard
  - arrangement of common pins
  - where to insert integrated circuits and other components
  - interconnection between different areas
- Measures:
- performing electrical measurements with tester
  - input and output voltages to the regulators
  - Dropout voltage of the regulator
  - Output current with use of shunt
  - Shunt resistor
  - Power dissipation on the regulator
- Connecting the **Arduino UNO** board to the PC with the USB cable and start the PC  
Installation of the **Arduino Software IDE** and open the file with the **code (Sketch) included**  
Code programming experiments on the Power Supply Trainer:
- Study the code provided
  - Change the code and to evaluate the effects
  - Re-program the internal microcontroller
- Electrical and electronic circuits of simple construction using the breadboard

## COURSE PROGRAM (cont.2)

### Experiments:

- Verification of Ohm's law
- Measurement of the voltage drop (V) and current (Ampere)
- Calculation of power in a resistive load
- Observation and experimentation of the following electrical and electronic components: button, switch, fixed and variable resistors, capacitors, standard and LED diodes, transistors, electromechanical relay, beeper, integrated circuit
- Circuits with resistors in series and in parallel
- The diode and the "unidirectional" in the direction of the current passing through it
- How to power LED diode
- Using the transistor as a switch
- How does the electromechanical relay
- How to activate the buzzer
- How to build a power supply
- Circuits to study Boolean algebra, the true / false variables (1/0) and the Boolean operators AND / OR / NOR / NAND

### TECHNICAL SPECIFICATIONS

#### No.1 Power Supply Trainer:

- No.7 Voltage outputs: No.5 fixed (+15V/0.5A, +12V/0.5A, +5V/2.5A, -15V/0.3A, -12V/0.3A), No.2 adjustable (+1.25 to +13V, -1.25 to -13V)
- No.1 Current output: positive voltage, adjustable, 250mAmax
- Total power supplied: 25W
- Atmega328P microcontroller inside: the code manages display, keyboard, outputs, LEDs and adapts the measures displayed by performing the scaling
- tracking function and output control on adjustable outputs
- No.2 potentiometers for adjustment of each adj voltage: Main and Fine (+/- 0.3V)
- No.2 output loads: 5 and 10 Ohm
- Display: 16 characters x 2 lines, blue LCD with white LED backlight, contrast adjustment, shows voltage and current measurements
- Arduino interface: type Female Header, 5 Contacts (RESET / MISO / MOSI / SCK / Ground), to connect the unit to an Arduino UNO board
- Breadboard interface: No.2 type Female Header, 5 contacts, connector 1 (+15V, +12V, + adj V, + 5V and ground), connector 2 (-15V, -12V, -adj V, current out and ground), to be used to power breadboard or external experimental circuits
- Synoptic panel: 300x160 mm, blue with white silkscreen
- Test points: for use with measuring instruments
- Header female: standards for connection to Arduino UNO board, Breadboard or experimental circuits
- Protection for power and temperature overload, and short circuit
- Sturdy box in ABS to protect the internal circuits making them inaccessible

## TECHNICAL SPECIFICATIONS (cont.1)

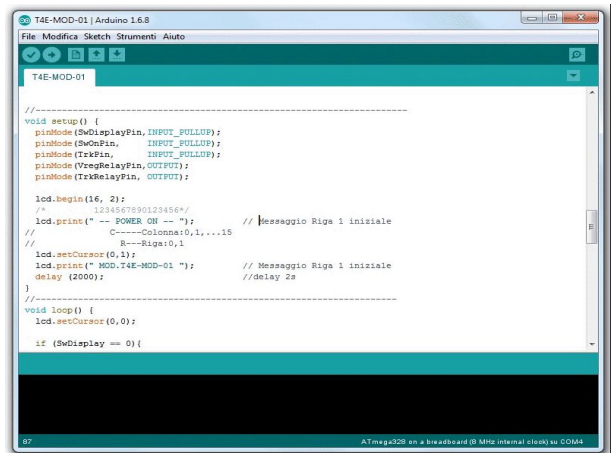
- No.1 Mains AC power cable: IEC60320
- No.1 Digital Multimeter:
  - Measuring: DC/AC voltage, DC current, resistance, diode and continuity test with buzzer
  - shock-resistant case
- No. 2 Crocodile clips: red and black
- No.1 Arduino UNO board
- No.1 USB cable 1,8m
- No.2 Breadboard: 840 holes, possibility to combine two breadboard into larger module through long or short side
- Passive and active electronic components set:
  - Resistors, ceramic and polarized capacitors, potenziometers
  - LEDs, diode, NPN transistors, buzzer, switches, relais
  - integrated circuits
- No.130 Jumper wire (terminated): male-male, various color and length
- No.140 Jumper wire (not terminated): stripped, ready to use, various colors and length
- No.1 Solid-core wire skein: 2 x 10 m, various colors
- No.1 Stripper
  - adjustable with screwdriver to adapt the wire diameter
  - compatible wire: from 0,5 to 4 mm
- No.1 Plier
- No.3 Educational Student manuals:
  - Power Supply Trainer manual: contains exercises that describe how to use the unit, the circuit design concepts, the description of the code used in the module
  - Accessories manual: contains exercises that describe how to use all accessories
  - Experimental manual: contains exercises that describe how to build all experimental circuits using breadboard

Power supply: 90-264VAC / 47-63Hz

Dimensions and weight:

- Packaging: No.2 350x230x120 mm

- Total weight: 2kg



### Example of installation and use

