

## Electronics for automation course

This course teaches the concepts and operating principles of the electronics, sensory devices and control circuits used in automated systems. You'll see how everything comes together

in vision systems and tactile sensing systems.

Thirteen experiments give hands-on experience with temperature, position, proximity sensing, motor speed measurement, opposed optical scanning and much more, all done with the HERO 2000 arm, remote console and experimenter card. This course requires a background in AC and DC electronics, semi-conductors, digital techniques and BASIC language programming. Comes with text, parts package and exams. Earn 6.0 CEUs.

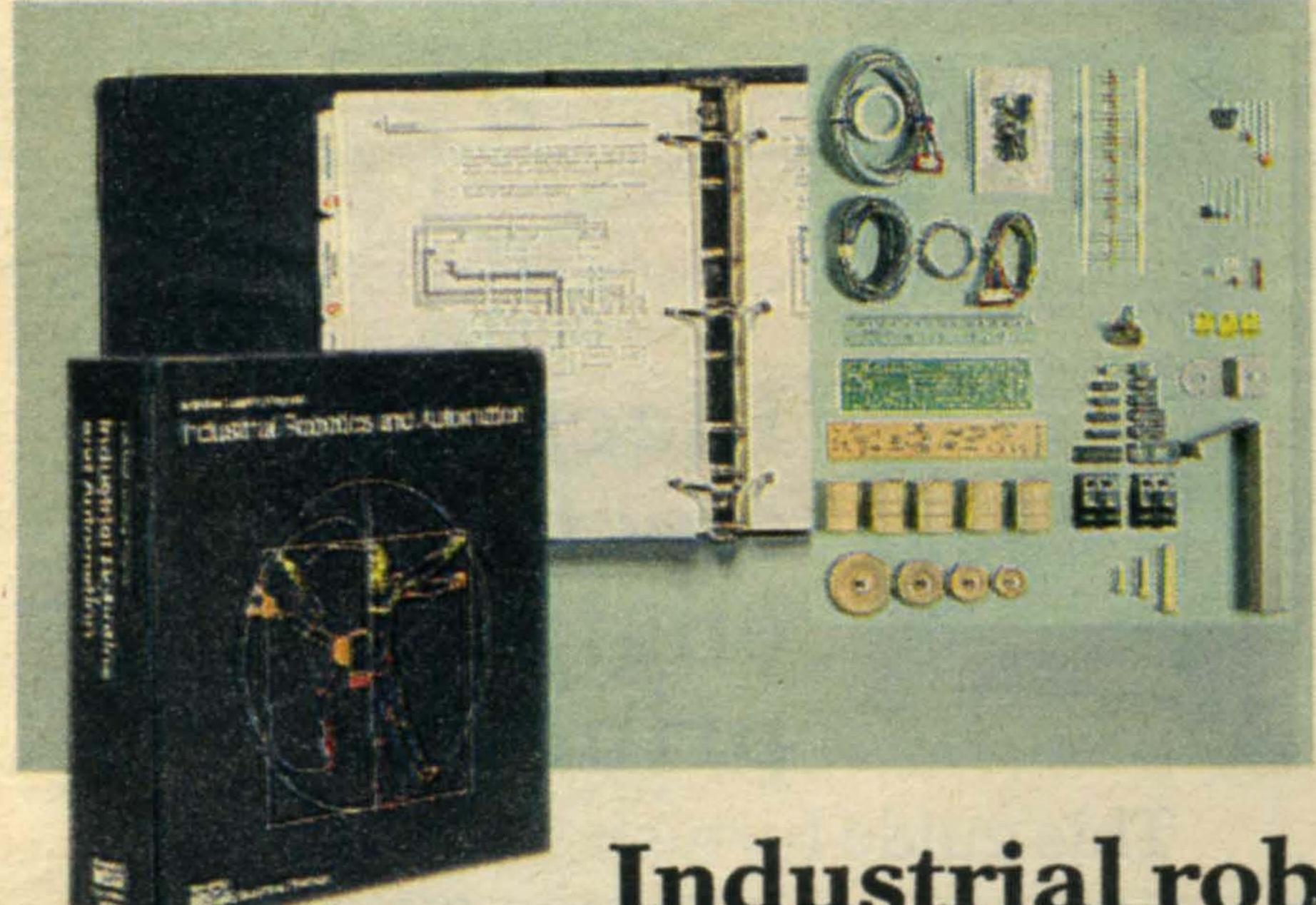
EE-1901 (11 lbs.) ..... \$99.95

## Programming and interfacing course

This course is an effective way to learn about both the hardware and software of the automation trainer and various robotic subsystems. In six units you'll look at HERO 2000's features, characteristics and monitor ROM, plus speech synthesis, motor movement, sensory systems and interfacing.

Programming and Interfacing includes 17 experiments performed on the HERO 2000 with arm and remote. To take the course, you should be familiar with BASIC programming language. Comes with text, parts package and exams. Earn 6.0 CEUs when you successfully complete the final exam.

EB-1950 (5 lbs.) ..... \$59.95



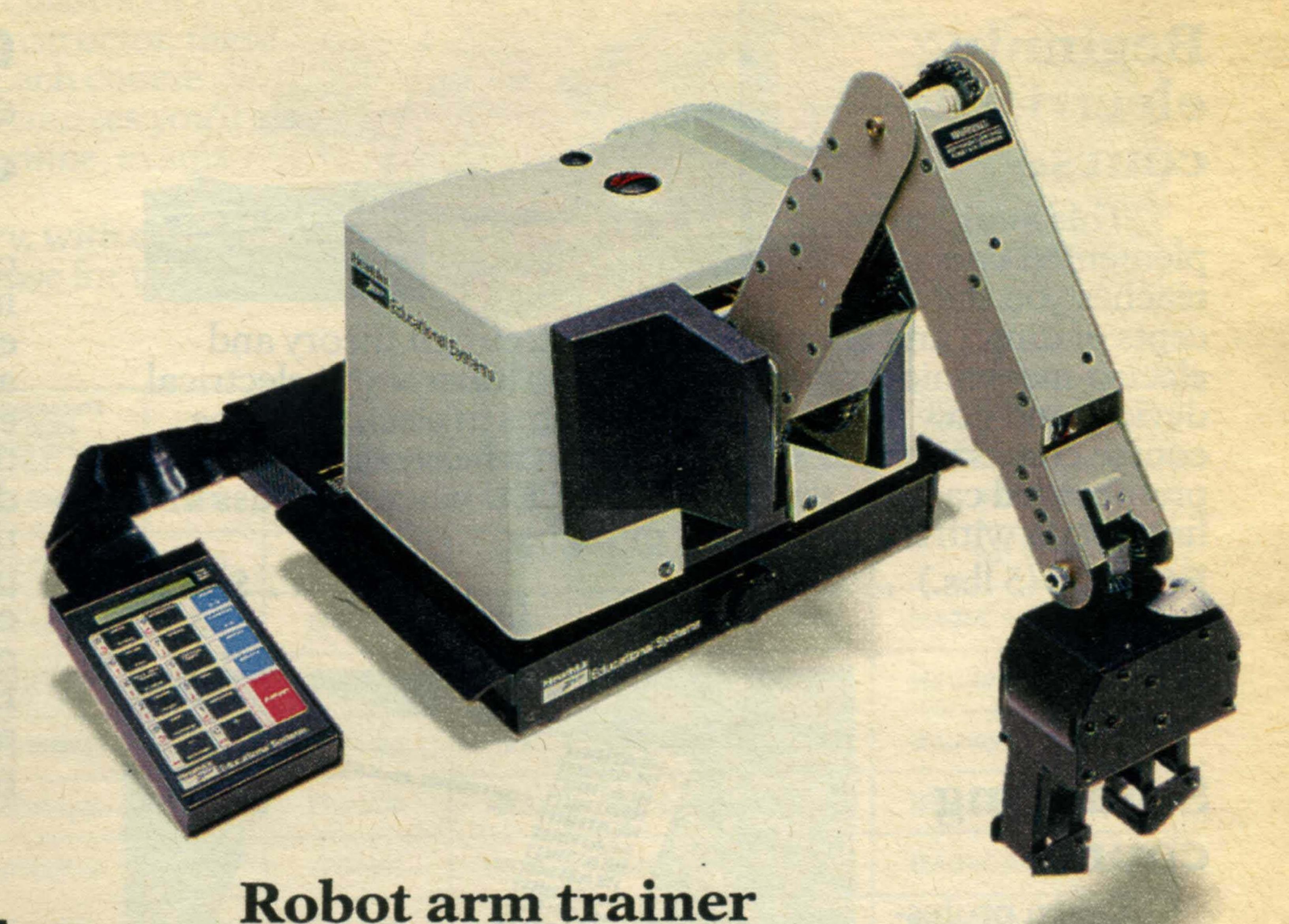
Industrial robotics and automation course

Learn about the physical and operating characteristics of a robot, servo control systems and the components of hydraulic and pneumatic power supplies, along with comparisons of

these systems to an electrical power system.

You'll learn, too, the applications for sensing/control/feed-back devices used by a robot, and you'll program a typical robot and workstation. To take Industrial Robotics and Automation, you should be familiar with BASIC programming language. Experiments are performed on the Robot Arm Trainer. Earn 4.0 CEUs when you successfully pass the final exam.

EE-1903 (8 lbs.) ..... \$79.95



Designed to simulate the operation of full-scale industrial robots, our Robot Arm Trainer is a highly effective learning aid that's simple to understand and operate. This trainer features five axes of motion, including wrist pitch and roll for precise pick and place movements. The arm can lift 1 lb., with a gripper force of up to 3¾ lb. And, our patented sense-of-touch gripper is programmable to exert specific amounts of force.

An on-board 8-bit CPU and six slave microprocessors control simultaneous operation of the trainer's functions so there's no need for an external computer. Six closed-loop DC servomotors move the arm accurately and smoothly through all its axes. This closed-loop system monitors both speed and position of each servomotor and reports to the controlling

microprocessor.

Menu-driven software leads you through the operations, eliminating the need for constant reference to manuals. You can program the trainer to perform tasks with up to 50 steps and even link tasks to create larger application programs. And, you'll find it easy to simulate real industrial applications thanks to our trainer's repeatability and accuracy.

We've included an emergency stop switch to make the robot arm safe for beginners and trainees. This top-mounted switch interrupts the trainer instantly without aborting the task in progress. And, built-in software limits prevent damage to the trainer if it's commanded to exceed its physical

limitations.

Included are 48K Bytes RAM, 32K Bytes ROM and a Z80A control CPU operating at 4 MHz. The Robot Arm Trainer also includes an industrial-type teaching pendant with a 17-key membrane pad and 16-character LCD readout, a built-in RS-232 port so you can interface with a terminal or external computer, and an 8-channel status port for sending and receiving data signals. Learn the fundamentals of robotics in industry as you turn your understanding of robotics theory into hands-on experience.

Kit ETS-19-32 (52 lbs.)	\$995.00
Assembled EWS-19-32 (100 lbs.)	\$1995.00
Accessory:	

Cassette Interface for storing programs on standard cassette tapes. ETW-19-31 (1 lb.) ...... \$99.95