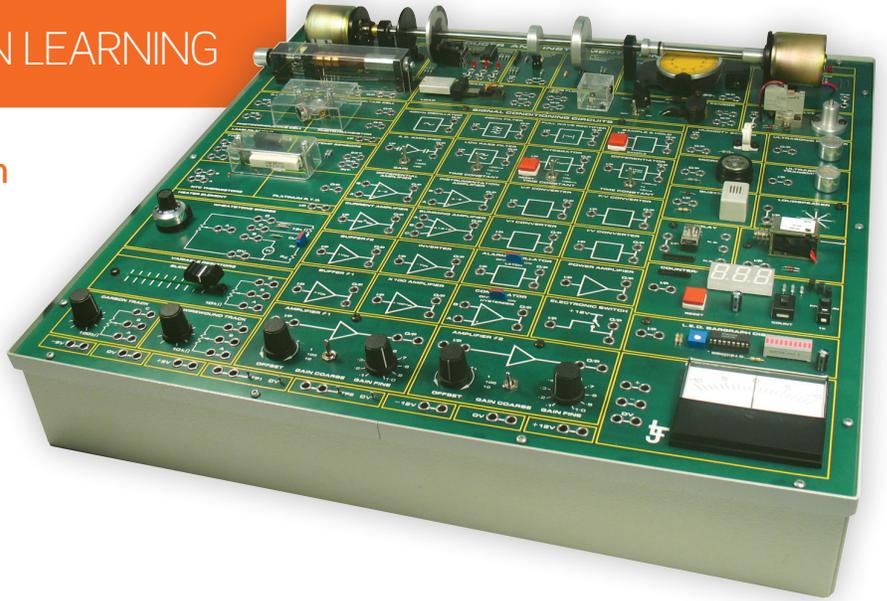




## ENGINEERING AND MANUFACTURING CONTROL SYSTEMS EQUIPMENT FOR HANDS-ON LEARNING

### Transducers and Instrumentation (24 Practical Activities)

- Types of sensors and actuators
- Purpose and function of sensors
- Measurement applications
- Electrical and pneumatic power sources
- Open and closed loop systems
- Overdamping and underdamped systems
- Three term control



## ELECTRICAL AND ELECTRONIC PRINCIPLES EQUIPMENT FOR HANDS-ON LEARNING

### Core Electronics Workstation (148 Practical Activities)

- Introduction to basic circuits
- DC circuits
- AC circuits and phasors
- Analog and digital signal conditioning
- Semiconductor devices
- Electromagnetic systems



## WORKING WITHIN THE ENGINEERING AND MANUFACTURING SECTORS EQUIPMENT FOR HANDS-ON LEARNING

### Engineering Construction Kit (112 Practical Activities)

- User requirements translated into engineering design
- Research and testing supporting effective design
- Relationship between manufacturing, processing and engineering design
- Engineering design in:
  - Manufacturing
  - Transportation
  - Mechatronics
  - Biomedical technology
  - Agriculture
  - Robotics



# MECHATRONICS

## EQUIPMENT FOR HANDS-ON LEARNING

### Programmable Logic Controls (23 Practical Activities)

- Operation, use and application of programmable logic controllers

### Pneumatics Trainer (8 Practical Activities)

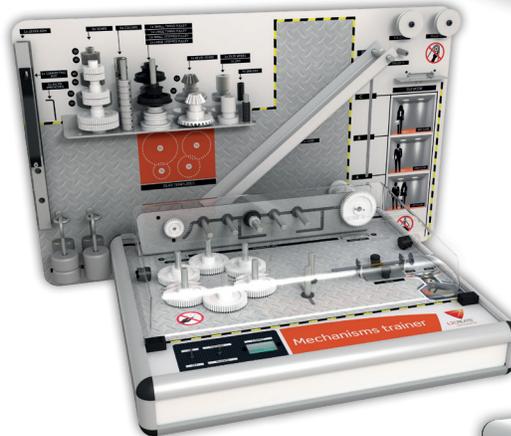
- Operation of electronic devices and circuits in mechatronics contexts

### Hydraulics Systems Trainer (7 Practical Activities)

- Basic principles and applications of hydraulics in relevant contexts

### Mechanisms Trainer (5 Practical Activities)

- Basic principles and applications of mechanisms in relevant contexts



# ESSENTIAL SCIENCE FOR ENGINEERING AND MANUFACTURING

## EQUIPMENT FOR HANDS-ON LEARNING

### Measurement Kit (5 Practical Activities)

- Techniques for making accurate measurements along with use of a range of measurement instruments
- Density

### Chemistry Apparatus Kit (39 Practical Activities)

- The structure of mixtures and solutions
- Chemical reactions such as acidity and alkalinity

### Force and Energy Kit (3 Practical Activities)

- Force, displacement and cause in work
- Calculating the amount of work

### Motion Kit (4 Practical Activities)

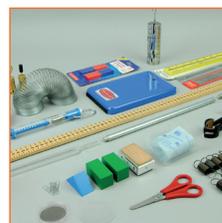
- Speed, velocity, acceleration, force and mass
- Linear momentum and impulse

### Physics Apparatus Kit (18 Practical Activities)

- Friction
- Conservation of energy

### Datalogging Kit (22 Practical Activities)

- Measurement
- Forces
- Motion



# Engineering and Manufacturing - Online Lessons Pack

## Course 1: Working within the Engineering and Manufacturing Sectors

- Engineering and manufacturing design
- Maintenance, installation and repair practices
- Manufacturing, processing and control practices

## Course 2: Engineering and Manufacturing Past, Present and Future

- Innovation and emerging trends
- Impact of technological advances

## Course 3: Engineering Representations

- Graphical information
- Drawing, dimensions and sizing

## Course 4: Essential Mathematics for Engineering and Manufacturing

- Basic arithmetic
- Algebra
- Geometry
- Area and volume
- Graphs and charts
- Trigonometry
- Vectors and moments

## Course 5: Essential Science for Engineering and Manufacturing

- Scientific method
- Measurement
- Chemical composition and behaviors
- Physical forces and behaviors
- Thermal dynamics
- Fluid dynamics

## Course 6: Materials and their Properties

- Material structures
- Metals
- Plastics
- Polymers
- Disposal of materials
- Material processing
- Heat treatments
- Material testing

## Course 7: Mechanical Principles

- Motion and mechanics
- Newton's laws
- Beams
- Gravity
- Friction
- Power sources

## Course 8: Electrical and Electronic Principles

- Atomic theory
- Voltage, current, and resistance
- Ohm's law
- DC and AC circuits
- Phasors
- Semiconductor devices
- Magnetism and electromagnetism

## Course 9: Mechatronics

- Electronic control of mechanical devices
- Programmable logic controllers
- Hydraulics
- Pneumatics

## Course 10: Engineering and Manufacturing Control Systems

- Open and closed loop systems
- Feedback
- Summing points
- PID control
- Transfer functions
- Overdamping and underdamping
- Industrial network systems
- Types of sensors and measurement applications

## Course 11: Quality Management

- BS and ISO standards
- Effects of standards on quality and safety

## Course 12: Health and Safety Principles and Coverage

- Health and safety in the workplace
- Fire Safety
- Chemical hazards
- Risk and hazard identification
- Control measures

## Course 13: Business, Commercial and Financial Awareness

- Commercial priorities
- Markets and customers
- Business models
- Profits and cash flow
- Budgets and recording financial transactions

## Course 14: Professional Responsibilities, Attitudes, and Behaviors

- Organizational structure
- Relationship to others
- Equality and inclusion
- Performance and error reduction
- Reputation and ethics

## Course 15: Stock and Asset Management

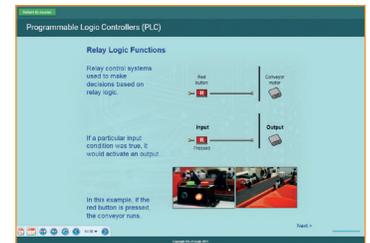
- Stock and inventory control
- Product life cycles
- Supply chain issues
- Warehousing
- Asset management

## Course 16: Continuous Improvement

- Principles of continuous improvement
- Planning, monitoring and implementing
- Lean principles and practices

## Course 17: Project and Program Management

- Project planning, control and practices
- Collaborative project working practices



If you'd like a call or a visit: **tel: 1-800-237-3482 | email: info@ljcreate.com**