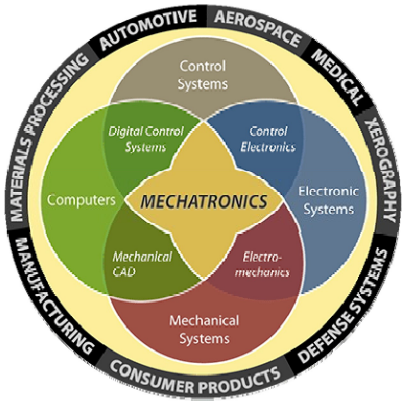
SIERRA COLLEGE

MECH 10
Fundamentals of Electronics

Mechatronics
Real Skills Real Jobs

Class 01
Introduction to Mechatronics



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- What is Mechatronics?
  - Mechatronics is the use of computers and sensors for the control of mechanical and electrical, labor saving devices.
- Why Study Mechatronics?
  - Non-critical thinking
  - Critical thinking
- The Mechatronics Technician
  - Qualities

- Why Study Mechatronics?
  - Non-critical thinking – the routine, repetitive use of information without analysis
  - Critical thinking – the analysis of information gathered from direct observation and used as a guide for action and belief

Assumptions – the enemy of critical thinking

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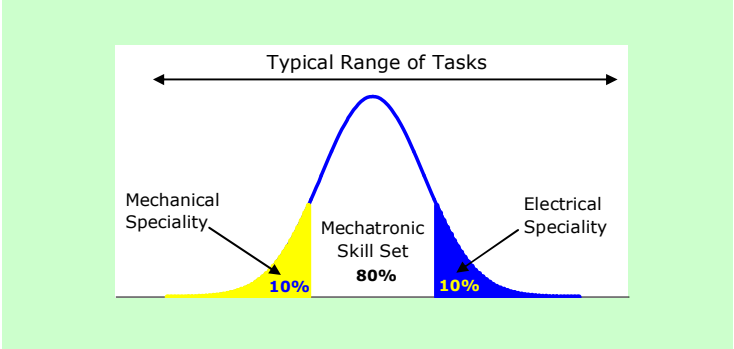
- The Mechatronics Technician
  - Today's Holistic Labor Model



- The Mechatronic Technician
  - Motivation
  - Curiosity
  - Persistence
  - Logical
  - Inspired

Critical Thinking!

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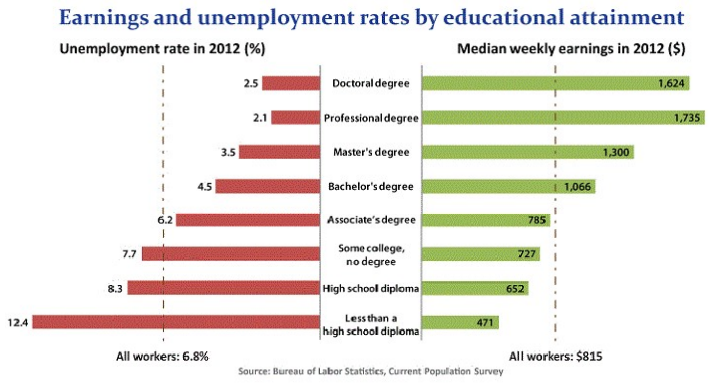
- Labor Trends



MECH 10
Fundamentals of Electronics

MECH 01	**Science of Electronics**	Entry Level!
MECH 04	Fundamentals of Mechatronics	Entry Level!
MECH 10	**Fundamentals of Electronics**	Entry Level!
MECH 14	Fabrication Techniques I	Entry Level!
MECH 25	PC Configuration & Repair	Entry Level!
MECH 44	**Mechatronics Processes and Materials**	Entry Level!
MECH 54	Mechatronics Systems	
MECH 90	Microcontroller Embedded Systems	

Skills Certificate

MECH 10
Fundamentals of Electronics

MECH 01	Science of Electronics	Entry Level!
MECH 04	**Fundamentals of Mechatronics**	Entry Level!
MECH 10	**Fundamentals of Electronics**	Entry Level!
MECH 14	**Fabrication Techniques I**	Entry Level!
MECH 25	**PC Configuration & Repair**	Entry Level!
MECH 44	**Mechatronics Processes and Materials**	Entry Level!
MECH 54	**Mechatronics Systems**	
MECH 90	**Microcontroller Embedded Systems**	

Mechatronics Certificate

- Add / Drop Policy
  - 24 Students Max!
  - No-shows dropped after first class
  - Adds from waitlist prior to third class
- High Risk Waiver
  - Required for course participation!
  - Due at the beginning of the second class!
- Course Syllabus

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- Troubleshooting
  - The identification, isolation and elimination of functional failures
    - Failure identification
    - Functional inventory
    - Failure mode analysis
    - Isolation & elimination
    - Solutions analysis

- Troubleshooting
  - **Failure Identification**
    - Expected operation
      - What is supposed to happen
    - Failure conditions
      - What was happening when the failure occurred
    - Failure time frame
      - *Continuous or intermittent*
    - Failure indicator
      - How do you know it failed

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- Troubleshooting
  - **Failure Identification –** problem statement
    - Grammatically correct complete sentences that summarize an operational failure.
      - Expected operation
      - Failure conditions
      - Failure time frame
      - Failure indicator

Expected operation – The circuit is expected to produce a square wave output with an amplitude of 5 volts and a frequency of 1 kHz.
Failure conditions – The circuit was constructed on a solderless breadboard with 15 volts DC applied across the circuit.
Failure time frame – The circuit initially produces the expected output, but then fails after a few minutes of operation.
Failure indicators – The failure was noted through observation of the output waveform with an oscilloscope. The output square wave changed from an amplitude of 5 volts to zero volts indicating the failure.

- Laboratory
  - Blinky Lights!
    - Become familiar with electronic circuit construction using a proto-board trainer.
    - Calculate the output frequency for an astable multivibrator circuit through direct observation.
    - Create a problem statement that accurately describes a problem associated with the circuit trainer or test equipment performance