



Republic of the Philippines

Department of Education

DepEd Complex, Meralco Avenue, Pasig City

STRENGTHENED SENIOR HIGH SCHOOL CURRICULUM

MECHATRONICS

Grade 11/12

Course Description:

This course equips learners with essential skills for Mechatronics Servicing. It covers mechatronic system installation and servicing following industry standards. Upon completion, learners are eligible to take assessments to earn National Certificate level II in Mechatronics, higher education, and careers in the electrical and electronics industry.

Elective: Technical Professional

Prerequisite: Electronic Product Assembly and Servicing

Time Allotment: 320 hours for one semester, 16 hours per week

Schedule: First/Second Semester

QUARTER 1

CONTENT STANDARD	The learners demonstrate an understanding of the principles of mechatronics servicing including its fundamentals, installation, and servicing.	
PERFORMANCE STANDARD	The learners perform procedures in mechatronic system installation and servicing while ensuring adherence to safety precautions.	
LEARNING COMPETENCIES	CONTENT	
1. Explain the overview of Mechatronics System	Overview of Mechatronics Servicing <ul style="list-style-type: none"> • Introduction to Mechatronics Servicing • Emerging trends in the field • Career and business opportunities 	
2. Discuss the control and power systems	Fundamentals of Mechatronics System <ul style="list-style-type: none"> • Control and power systems <ul style="list-style-type: none"> ○ Pneumatic Circuits ○ Hydraulic Circuits ○ Electro-Pneumatic Circuits ○ Motor Control Circuits 	
3. Discuss mechatronic system installation	Mechatronic Systems Installation <ul style="list-style-type: none"> • Schematic Diagram and Layout • Tools, equipment, and devices • Installation • Testing • Documentation and Costing 	
4. Apply the procedures in installation of mechatronic system based on layout plan		

<p>5. Discuss mechatronic system servicing</p> <p>6. Perform the procedure in servicing mechatronic system</p>	<p>Mechatronics System Servicing</p> <ul style="list-style-type: none"> • Diagnostic tools <ul style="list-style-type: none"> ○ Multimeters ○ Oscilloscopes ○ Signal generators • Common defects and corrective actions • Troubleshooting, Repairing, Testing, and Maintaining • Documentation and Service Costing
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QUARTER 2

CONTENT STANDARD	The learners demonstrate an understanding of the principles of programmable logic controllers, and control logic programming.	
PERFORMANCE STANDARD	The learners perform procedures in programmable logic controller programming and configuring while ensuring adherence to safety precautions.	
LEARNING COMPETENCIES	CONTENT	
1. Discuss programmable logic controllers	<p>Programmable Logic Controllers (PLCs)</p> <ul style="list-style-type: none"> • PLC Requirements • PLC Types • PLC I/O Circuits 	
<p>2. Discuss control logic programming</p> <p>3. Perform programmable logic controller programming</p>	<p>Programmable Logic Controller (PLC) Programming</p> <ol style="list-style-type: none"> 1. Control logic programming 2. Existing program modifications 3. PLC uploading and downloading 4. Testing 	
4. Apply configuration of mechatronic devices	<p>Configuring Mechatronic Devices</p> <ul style="list-style-type: none"> • Sensors and actuators configuration • PLC programs and control sequence testing 	

GLOSSARY

Actuator: A device that converts energy into mechanical motion.

Control Board: A circuit board that manages device or system operations.

Control Logic Programming: Writing instructions for automated systems, typically for Programmable Logic Controllers (PLCs).

Electro-Pneumatic Circuit: A system using electrical signals to control pneumatic mechanisms.

Hydraulic Circuit: A system using liquid pressure for mechanical operations.

Industrial Control Relay Circuit: A circuit used to control high-power devices via low-power signals.

Logic Probe: A tool for analyzing logic states in digital circuits.

Mechatronics System: A system combining mechanical, electronic, and computing technologies.

Motor Controller: A device for regulating motor operation, including speed and direction.

Oscilloscope: A diagnostic tool that displays electronic signal waveforms.

Preventive Maintenance: Scheduled maintenance to prevent failures.

Programmable Logic Controller (PLC): An industrial computer for automating machinery and processes.

Recording and Reporting Procedures: Methods for documenting service activities and outcomes.

Sensor: A device detecting environmental changes and converting them into signals.

Signal Generator: An instrument creating signals for testing electronic circuits.

Specialized Hand Tools: Advanced tools for specific servicing tasks, like soldering.

Technical Drawing: A detailed plan or diagram for electronic or mechanical systems.

Troubleshooting: Diagnosing and solving problems in systems.

Working Principle: The fundamental mechanism by which a device or system operates.

TOOLS, MATERIALS, AND EQUIPMENT

TOOLS	MATERIALS	EQUIPMENT
Long-nosed pliers	Solder lead	Multimeter (analog/digital)
Diagonal cutters	Shielded cable	Air compressor
Standard screwdrivers	Terminal lugs	Transmitters or Transducers
Phillips screwdrivers	Terminal strips/blocks	Regulated DC power supplies
Electrical pliers	Cotton gloves	Cylinder actuators
Soldering iron	Plastic tubing	Buzzers
Adjustable wrench	Quick-connect fittings	Industrial panel switches
Wire stripper	Electrical tape	Indicating lamps
Crimping tool	Wire markers	Directional solenoid valves
Allen wrench	Cable ties	Pressure gauge
Precision screwdrivers		Filter-regulator-lubricator set
		Limit switches
		Photoelectric switches
		Proximity switches
		Relays
		Magnetic contactors
		Timers
		Counters
		Desktop/Laptop PC
		Safety helmet
		Safety harness
		Safety glasses/goggles

		Ear plugs/ear muffs
		Gas mask
		Face shield
		20 I/O's PLC

REFERENCES

Chemnitz University of Technology Institute for Machine Tools and Production Processes (2005) *Mechatronics*

Robert H. Bishop. (2002). *Mechatronics Handbook*. The University of Austin Texas. Retrieved from https://ris.utwente.nl/ws/portalfiles/portal/134651109/Mechatronics_handbook_1_.pdf

Siemens (2010) *Programming with STEP 7*. Retrieved from https://cache.industry.siemens.com/dl/files/107/45531107/att_91661/v1/S7pr__b.pdf

Technical Education and Skills Development Authority (TESDA)(CY 2014) *Training Regulations for Mechatronics Servicing NC II*. Retrieved from <https://tesda.gov.ph/Downloadables/TR-Mechatronics%20Servicing%20NC%20II.pdf>