9 Mechatronics		
Criteria	Range	Resource identified
9.1 The key components of a mechatronics system.	Mechanical (gears, cams, linkages, levers, pulleys)	https://technologystudent.com/cams/camdex.htm http://dtnmn.weebly.com/types-of-mechanisms.html http://wiki.dtonline.org/index.php/Category:Mechanisms
	Electrical/electronic (sensors and transducers, microprocessors, microcontrollers, actuators)	https://www.reac-group.com/en_en/facts/actuators/what-is-an-actuator/ https://www.electronics-tutorials.ws/io/io_1.html https://internetofthingsagenda.techtarget.com/definition/microcontroller https://www.eit.edu.au/resources/types-and-applications-of-microcontrollers/
	Common drive devices (standard electrical motors, servo motors, stepper motors)	https://www.automate.org/blogs/types-of-electric-motors https://www.rs-online.com/designspark/different-types-of-motors-and-their-use https://www.elprocus.com/different-types-of-electric-motors/
9.2 The operation, function and applications of programmable logic controllers (PLC) in mechatronic systems.	PLC types (unitary, unitary with modular features, modular)	https://www.electrical4u.com/programmable-logic-controllers/ https://basicplc.com/different-types-of-plc/ https://instrumentationtools.com/types-of-plc/
	PLC architecture	https://processsolutions.com/basic-architecture-of-programmable-logic-controller/ https://www.wisdomjobs.com/e-university/programmable-logic-controllers-tutorial-523/internal-architecture-14628.html https://www.youtube.com/watch?v=p-p2IjxGelQ
	Sensor signal conditioning	https://www.youtube.com/watch?v=HSHJXXFigz8 https://en.wikipedia.org/wiki/Signal_conditioning https://dewesoft.com/daq/what-is-signal-conditioning

	Programming	https://www.watelectronics.com/how-to-program-the-programmable-logic-controllers/ https://electrical-engineering-portal.com/resources/plc-programming-training https://www.learnrobotics.org/blog/plc-programming-languages/ https://instrumentationtools.com/plc-controls-motor/
	Process blocks	https://en.wikipedia.org/wiki/Function_block_diagram
	Motor drives	https://instrumentationtools.com/plc-controls-motor/ https://www.allaboutcircuits.com/technical-articles/how-to-choose-the-right-motor-driver-ic/
	Applications - robotic arms	https://www.youtube.com/watch?v=3lP7fkEMEqE https://www.youtube.com/watch?v=88xH9ASsXDE https://www.youtube.com/watch?v=6dev9c79zWE
	Applications - conveyor belts	https://www.youtube.com/watch?v=_yG3MwEWv_0 https://www.youtube.com/watch?v=nv17SkwP9vo
	Applications - packaging	https://instrumentationtools.com/plc-packaging-process/ https://www.mikroe.com/ebooks/introduction-to-plc-controllers/7-8-automation-of-product-packaging
	Applications - supervisory control and data acquisition (SCADA)	https://inductiveautomation.com/resources/article/what-is-scada https://en.wikipedia.org/wiki/SCADA https://www.youtube.com/watch?v=nlFM1q9QPJw
	Applications - remote technical units	https://en.wikipedia.org/wiki/Remote_terminal_unit https://electronicscoach.com/remote-terminal-unit.html
	Applications - animatronics	https://en.wikipedia.org/wiki/Animatronics

9.3 The basic principles of hydraulics and pneumatics.	Transmission of power	https://en.wikipedia.org/wiki/Fluid_power https://www.nfpa.com/home/About-NFPA/What-is-Fluid-Power.htm
	Fluid compressibility	https://www.engineersedge.com/fluid_flow/compressibility.htm https://www.youtube.com/watch?v=zlQyckTvSFE
	Components (valves, pumps, actuators, cylinders, compressors)	http://wiki.dtonline.org/index.php/Pneumatic_Components_and_Symbols https://www.smcpneumatics.com/Pneumatic-System-Components-Their-Functions_b_71.html https://coalhandlingplants.com/hydraulic-system/