# **Work Process Schedule**

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| Mechatronics Technician/Engineer (Intermediate, Installer-Focus) | |
| **Job Description:** Work with mechanical machinery supported by information technology in dynamic environments using a variety of measurement and computer equipment and tools | |
| **RAPIDS Code:** 2014CB | **O\*NET Code:** 49-2094.00 |
| **Estimated Program Length:** 4 years | |
| **Apprenticeship Type:**  Competency-Based  Time-Based  Hybrid | |

Suggested On-the-Job Learning Outline

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| Maintain safety and health at work while contributing to the avoidance of instances of environmental pollution caused by the company | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Procure and evaluate information |  |  |
| 1. Conduct discussions with line managers, colleagues, and within the team in a manner appropriate to the situation; present facts and circumstances |  |  |
| 1. Use opportunities to resolve conflicts |  |  |
| 1. Handle IT systems and, in particular, deploy software and connect and use peripheral devices |  |  |
| 1. Protect and secure data |  |  |
| 1. Prepare protocols and reports using standard software |  |  |
| 1. Read and use partial, group, and overall drawings |  |  |
| 1. Read and use circuit documentation on sub-assemblies and devices used in fluid power |  |  |
| 1. Read and use electrical, block, function, assembly, and connection plans |  |  |
| 1. Utilize technical regulations, operating instructions, work directives, and other information |  |  |
| 1. Explain products and work results on handover and provide initial instructions on function |  |  |
| 1. Use company information and communication systems |  |  |

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| Plan and control work processes and check and evaluate the quality of work | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Stipulate stages of work in accordance with functional, technical production and business criteria |  |  |
| 1. Stipulate and secure work processes in accordance with organizational and information criteria |  |  |
| 1. Plan work in a team; assign tasks |  |  |
| 1. Plan and set up the workplace |  |  |
| 1. Request and provide materials, tools, and equipment in an order-related manner |  |  |
| 1. Prepare processing machines for the work process |  |  |
| 1. Calibrate tools, machine tools, testing and measuring equipment, and technical equipment ready for operational use; check and maintain such tools and equipment and initiate measures for the rectification of errors |  |  |
| 1. Monitor, evaluate, and check own work and work done by others |  |  |
| 1. Document materials, spare parts, work time, and technical checks |  |  |
| 1. Observe standards and specifications for quality assurance of the products and secure quality in completing the order with due consideration for upstream and downstream divisions |  |  |

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| Check, mark off, and label workpieces to ensure quality assurance | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Measure lengths, observe tolerances, and check matching |  |  |
| 1. Check areas for evenness, angularity, and precision of form, and evaluate the quality of surface areas |  |  |
| 1. Monitor form of surface areas and characteristics of joining surfaces in accordance with technical requirements |  |  |
| 1. Mark off and label workpieces |  |  |
| 1. Measure angles and check them using angle gauges |  |  |

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| Cut, separate, and reform manually or by machine and then join equipment  Competencies | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Select and use measuring instruments for the measurement and checking of lengths, angles, and areas |  |  |
| 1. Saw sheet metals, boards, and metal and plastic profiles as marked out |  |  |
| 1. File and chamfer areas and forms on workpieces so they are flat, angled, and parallel to measure |  |  |
| 1. Create and deburr drill holes |  |  |
| 1. Create internal and external screw threads |  |  |
| 1. Process workpieces by turning |  |  |
| 1. Process workpieces by milling |  |  |
| 1. Cut metal and acrylic sheets profiles as marked out |  |  |
| 1. Select and install fasteners according to torque specifications |  |  |
| 1. Install dowels and pins |  |  |
| 1. Join pipe connections |  |  |
| 1. Weld, cut, deburr, and thread metal pipes |  |  |

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| Install electrical subassemblies and components | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Assemble, connect, and wire electrical components, housings, and circuit unit combinations |  |  |
| 1. Select, install, connect, and label components for electrical auxiliary and circuit units |  |  |
| 1. Install and label components for open- and closed-loop control; measure, test, and debug |  |  |
| 1. Select, prepare, lay, and connect cables according to electrical load, routing, and purpose |  |  |
| 1. Wire up sub-assemblies and devices using various methods according to documentation and prints |  |  |
| 1. Correct errors and document changes to electrical prints |  |  |

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| Measure and test electrical values and install and test hardware and software components | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Specify measuring procedures and devices; assess measurement errors, and set up measuring equipment |  |  |
| 1. Measure voltages, current; then select correct size of cables and/or conductors |  |  |
| 1. Measure and test analog and digital signals |  |  |
| 1. Check electrical parameters of sub-assemblies and components |  |  |
| 1. Build electrical circuits and test function |  |  |
| 1. Test hardware and software interfaces, compatibility of hardware components, and system requirements with software |  |  |
| 1. Assemble and connect system components |  |  |
| 1. Configure hardware; install and test software |  |  |
| 1. Install and configure network systems |  |  |
| 1. Test signals at interfaces, interpret protocols, and test systems |  |  |
| 1. Carry out version changes of software |  |  |
| 1. Document changes in hardware and software |  |  |

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| Build and test control systems and program mechatronic systems | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Install, connect, and test electrical and fluid power circuits |  |  |
| 1. Build and connect electrical and fluid power circuits; test and adjust systems for the provision of electrical, pneumatic, or hydraulic pressure |  |  |
| 1. Measure and adjust pressure in fluid power systems |  |  |
| 1. Analyze assignment, in particular sequences and reciprocal effect, at interfaces of the system to be controlled |  |  |
| 1. Align control concepts and select control equipment |  |  |
| 1. Install sensors, actuators, and valving |  |  |
| 1. Check and adjust the interaction of connected functions; consider interfaces in localizing errors |  |  |
| 1. Evaluate control systems of different designs |  |  |
| 1. Prepare, enter, and test application programs for control systems |  |  |
| 1. Monitor program process in mechatronic systems; identify and rectify errors |  |  |

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| Assemble subassemblies and components into machines and systems | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Identify and troubleshoot sub-assemblies and components and check that characteristics are error-free |  |  |
| 1. Carry out preliminary installations |  |  |
| 1. Install lubricating and cooling systems |  |  |
| 1. Install fluid power component, in particular cylinders and valves |  |  |
| 1. Prepare, lay, and connect up pipes and hoses; check for leaks |  |  |
| 1. Match sub-assemblies and components, adjust to the correct functionality, and secure position |  |  |
| 1. Install mechanical drive systems, drives, gears, and coupling systems, and verify the functionality of movable parts |  |  |
| 1. Install and connect circuit devices |  |  |
| 1. Install, adjust, and connect sensors |  |  |
| 1. Check functions during the installation process |  |  |

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| Test and adjust the functioning of mechatronic systems | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Install/troubleshoot signal processing sub-assemblies and check incoming and outgoing signals |  |  |
| 1. Calibrate measuring equipment for the recording of pressure and temperature |  |  |
| 1. Adjust sensing distance of sensors |  |  |
| 1. Install and adjust actuators in accordance with technical specifications |  |  |
| 1. Locate symptoms and faults for mechanical, fluidic, and electrical equipment through visual checks, testing, and measurement |  |  |
| 1. Install and troubleshoot Variable Frequency Drives (VFD |  |  |
| 1. Install, test, and debug automated manufacturing equipment |  |  |

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| Commission, operate, and maintain mechatronic systems | | |
| **Competencies** | **Date Completed** | **Initial** |
| 1. Check guarding against direct contact |  |  |
| 1. Check effectiveness of protective measures, in particular, fault current protective equipment, measure insulation, and short circuits |  |  |
| 1. Check the effectiveness of mechanical and electrical safety fixtures, in particular, emergency off switches and alarm systems |  |  |
| 1. Test and commission auxiliary and control current circuits including the relevant signal and command transmitters for open and closed loop control and monitoring systems |  |  |
| 1. Check main circuits and gradually commission, measure operational values, and adjust target values |  |  |
| 1. Commission fluid power equipment |  |  |
| 1. Check and secure fixing, energy supply, lubrication, cooling, and disposal systems |  |  |
| 1. Load and secure programs and data; check and adjust program process |  |  |
| 1. Check protective measures for electromagnetic compatibility |  |  |
| 1. Identify system parameters at the time when commissioning takes place; compare with stipulated values and adjust |  |  |
| 1. Inspect mechatronic systems, check function of safety systems and protocol checks |  |  |
| 1. Dismantle devices and sub-assemblies, noting their function, and label parts with regard to position and functional alignment |  |  |
| 1. Correct malfunctions by conducting remedial procedures and exchanging parts and sub-assemblies |  |  |
| 1. Correct software errors |  |  |
| 1. Compare system parameters with stipulated values and make adjustments |  |  |
| 1. Repair mechatronic systems with due consideration for company processes |  |  |

Suggested Related Instruction Outline

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| Provider | |
| **Name:** | |
| **Address:** | |
| **Email:** | **Phone Number:** |
| **Suggested Related Instruction Hours:** 576 | |

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| **Course Number** | **Course Title** | **Contact Hours** |
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