

MECHATRONICS 3
COURSE CODE: 6212
STUDENT PROFILE

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| STUDENT'S NAME: | | TEACHER'S NAME: | | | |
| School Year/Semester: | | Grade: | | | |
| Begin Date: | | Date Completed: | | | |
| <p>Directions: Document student's progress using the applicable rating scales below: Enter date of completion under the appropriate column.</p> <p>0 - Has not received instruction in this area / no experience or knowledge of this task (N/A)</p> <p>1 – Can apply and perform independently (80-100)</p> <p>2 – Can perform the task completely with limited supervision (70-79)</p> <p>3 – Requires additional instruction and or close supervision (60-69)</p> | | | | | |
| A. SAFETY | | 0 | 1 | 2 | 3 |
| 1 | Review school safety policies and procedures. | | | | |
| 2 | Review classroom safety rules and procedures. | | | | |
| 3 | Review safety procedures for using equipment in the classroom. | | | | |
| 4 | Identify major causes of work-related accidents in office environments. | | | | |
| 5 | Demonstrate safety skills in an office/work environment. | | | | |
| B. STUDENT ORGANIZATIONS | | 0 | 1 | 2 | 3 |
| 1 | Identify the purpose and goals of a Career and Technology Student Organization (CTSO). | | | | |
| 2 | Explain how CTSOs are integral parts of specific clusters, majors, and/or courses. | | | | |
| 3 | Explain the benefits and responsibilities of being a member of a CTSO. | | | | |
| 4 | List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities. | | | | |
| 5 | Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations. | | | | |
| C. TECHNOLOGY KNOWLEDGE | | 0 | 1 | 2 | 3 |
| 1 | Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation | | | | |
| 2 | Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes. | | | | |
| 3 | Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks. | | | | |

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| 4 | Explain the consequences of social, illegal, and unethical uses of technology (e.g., cyber bullying; piracy; illegal downloading; cyberbullying; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment). | | | | |
| 5 | Discuss legal issues and the terms of use related to copyright laws, fair use laws, and ethics pertaining to downloading of images, photographs, Creative Commons, documents, video, sounds, music, trademarks, and other elements for personal use. | | | | |
| 6 | Describe ethical and legal practices of safeguarding the confidentiality of business-related information. | | | | |
| 7 | Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks. | | | | |
| D. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS | | 0 | 1 | 2 | 3 |
| 1 | Demonstrate punctuality. | | | | |
| 2 | Demonstrate critical thinking and problem-solving skills | | | | |
| 3 | Demonstrate initiative and self-direction. | | | | |
| 4 | Demonstrate integrity. | | | | |
| 5 | Demonstrate work ethic. | | | | |
| 6 | Demonstrate conflict resolution skills. | | | | |
| 7 | Demonstrate listening and speaking skills. | | | | |
| 8 | Demonstrate respect for diversity. | | | | |
| 9 | Demonstrate customer service orientation. | | | | |
| 10 | Demonstrate teamwork. | | | | |
| E. PROFESSIONAL KNOWLEDGE | | 0 | 1 | 2 | 3 |
| 1 | Demonstrate global or “big picture” thinking. | | | | |
| 2 | Demonstrate career and life management skills and goal-making. | | | | |
| 3 | Demonstrate continuous learning and adaptability skills to changing job requirements. | | | | |
| 4 | Demonstrate time and resource management skills. | | | | |
| 5 | Demonstrates information literacy skills. | | | | |
| 6 | Demonstrates information security skills. | | | | |
| 7 | Demonstrates information technology skills. | | | | |
| 8 | Demonstrates knowledge and use of job-specific tools and technologies. | | | | |
| 9 | Demonstrate job-specific mathematics skills. | | | | |
| 10 | Demonstrates professionalism in the workplace. | | | | |
| 11 | Demonstrates reading and writing skills. | | | | |
| 12 | Demonstrates workplace safety. | | | | |

| F. MOTOR CONTROLS AND STARTERS | | 0 | 1 | 2 | 3 |
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| 1 | Define the following terms: a) Ampacity b) Branch circuit c) Circuit breaker d) Controller e) Duty f) Equipment g) Full-load amps h) Ground fault circuit interrupter i) Interrupting rating j) Motor circuit switch k) Thermal protector l) NEMA design letter m) Non-Automatic n) Overcurrent o) Overload p) Power factor q) Rated full-load speed r) Rated horsepower s) Service factor t) Thermal cutout u) Remote control circuit | | | | |
| 2 | Describe the various types of motor enclosures. | | | | |
| 3 | Describe how the rated voltage of a motor differs from the system voltage. | | | | |
| 4 | Describe the basic construction and components of a three-phase squirrel cage induction motor. | | | | |
| 5 | Explain the relationships among speed, frequency, and the number of poles in a three-phase induction motor. | | | | |
| 6 | Describe how torque is developed in an induction motor. | | | | |
| 7 | Explain how and why torque varies with rotor reactance and slip. | | | | |
| 8 | Define percent slip and speed regulation. | | | | |
| 9 | Explain how the direction of a three-phase motor is reversed. | | | | |
| 10 | Describe the component parts and operating characteristics of a three-phase wound rotor induction motor. | | | | |
| 11 | Describe the component parts and operating characteristics of a three-phase synchronous motor. | | | | |
| 12 | Define torque, starting current, and armature reaction as they apply to DC motors. | | | | |
| 13 | Explain how the direction of rotation of a DC motor is changed. | | | | |
| 14 | Describe the design and characteristics of a DC shunt, series, and compound motor. | | | | |
| 15 | Describe dual-voltage motors and their applications. | | | | |
| 16 | Describe the methods for determining various motor | | | | |

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| | connections. | | | | |
| 17 | Describe general motor protection requirements as delineated in the National Electrical Code (NEC). | | | | |
| G. HYDRAULICS (OPTIONAL PER DISTRICT ADVISORY RECOMMENDATION) | | 0 | 1 | 2 | 3 |
| 1 | Demonstrate hydraulic system safety. | | | | |
| 2 | Explain the principles of hydraulics and hydraulic fluids. | | | | |
| 3 | Demonstrate the ability to read, construct, and interpret hydraulic fluid power symbols as well as fluid power diagrams. | | | | |
| 4 | Identify the various configurations of hydraulic directional control valves (DCV). | | | | |
| 5 | Explain hydraulic systems (forces, speed, friction, flow, and pressure). | | | | |
| 6 | Identify types of hydraulic pumps, motors, and actuators. | | | | |
| 7 | Construct hydraulic systems from component and schematic symbols. | | | | |
| 8 | Demonstrate correct installation and maintenance as well as preventive maintenance techniques for hydraulic fluid power systems using schematic diagrams. | | | | |
| 9 | Troubleshoot and repair hydraulic fluid power systems using schematic diagrams. | | | | |
| H. ELECTRICAL TEST EQUIPMENT | | 0 | 1 | 2 | 3 |
| 1 | Demonstrate the operation of the following pieces of test equipment: a) Clamp-On Ammeter b) Multimeter c) Frequency meter d) Oscilloscope (Optional) e) Voltage tester f) Megger (Optional) | | | | |
| 2 | Represent results using engineering notation. | | | | |
| 3 | Demonstrate the importance of proper meter polarity. | | | | |
| 4 | Demonstrate frequency using a frequency meter. | | | | |
| 5 | Compare the difference between digital and analog meters. | | | | |
| I. PROFESSIONAL DEVELOPMENT | | 0 | 1 | 2 | 3 |
| 1 | Examine the extent of career opportunities in manufacturing and the education required for entry level employment. | | | | |
| 2 | Identify available resources to find a specific manufacturing career and/or job. | | | | |
| 3 | Recommend a program designed to develop technical skills and knowledge needed in a chosen manufacturing field and identify the strengths of the program. | | | | |
| 4 | Build an inventory of work attitudes, personality traits, and professional characteristics needed for a successful career in Mechatronics. | | | | |
| 5 | Produce a resume and cover letter demonstrating the education | | | | |

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| | qualifications and/or experience level necessary for a chosen engineering major or career opportunity. | | | | |
| 6 | Develop a personal written or digital portfolio showcasing professional writing samples, creative designs, research materials and notable accomplishments. | | | | |
| 7 | Produce a research document that examines the ethics, fundamental practices, and professional obligations required to exhibit high standards of integrity in the field of Mechatronics. | | | | |