



Albany High School
Pre-Engineering Employability Profile
Program Year I__ II__ III__

Student Name: _____ Student ID: _____
(Last) (First)

I. TECHNICAL SKILLS

Key:

- (1) Limited skills, requires instruction & close supervision
- (2) Moderately skilled, needs limited supervision
- (3) Skilled, can work independently w/out supervision
- (NE) No Exposure in this area

Overview of Engineering

- __ Describe major engineering fields
- __ Identify functions an engineer performs
- __ Describe education required to be an engineer
- __ Identify ethics related to engineering situations
- __ Describe relationships between the engineer and other technical personnel
- __ Identify the progression of the engineering field

Design Process/Problem Solving

- __ Identify principles of the problem solving process
- __ Outline the steps in the design process
- __ Translate word problems into mathematical statements
- __ Analyze solutions, identifying strengths and weaknesses
- __ Develop details of a solution
- __ Develop, test, and redesign prototypes

Manufacturing

- __ Explain components of set up, machining, casting, molding, welding, and finishing
- __ Identify and use common hand tools
- __ Identify and properly use fasteners
- __ Estimate and measure the size of objects using SI and US units
- __ Explain the role of quality control in manufacturing
- __ Measure with precision tools and instruments

Assembly and Fabrication

- __ Explain the role of quality control in assembly and fabrication
- __ Identify situations of supplying and outsourcing
- __ Identify the order and methodology of the assembly process

Materials

- __ Identify common materials
- __ Compare and contrast physical properties of materials
- __ Select correct materials for specific functions
- __ Test materials for specific characteristics

Communication and Teamwork

- __ Read and understand design documentation and technical manuals
- __ Write technical reports
- __ Make an oral presentation
- __ Interpret critical aspects and/or types of engineering drawings and plans
- __ Express data in tables, graphs, and charts
- __ Contribute to a team project

Safety

- __ Exhibit knowledge of appropriate personal safety procedures
- __ Describe the role of OSHA in the technical workplace
- __ Describe and use safety equipment
- __ Describe the function of safety devices

Engineering Systems

- __ Solve problems using vectoring, predict resultant forces
- __ Demonstrate the effect of resistance
- __ Apply Ohm's Law, Watt's Law, and Kirchoff's Law
- __ Identify series, parallel, and combination circuits
- __ Apply knowledge of AC and DC systems
- __ Identify what causes resistance in a fluid system
- __ Apply knowledge of hydraulic and pneumatic systems
- __ Identify the three ways heat is transferred
- __ Explain the difference between Celsius and Fahrenheit scales
- __ Describe heat conductors and insulators
- __ Solve thermal problems using appropriate units
- __ Identify the six simple machines and their applications
- __ Solve problems using appropriate units in engineering systems
- __ Identify the uses and types of inductors and capacitors
- __ Use appropriate electrical units to solve problems
- __ Draw a circuit diagram and lay out the circuit
- __ Identify the difference between analog and digital signals

(over)

- ___ Identify direction of heat flow given differences in temperature
- ___ Understand the use of insulation to minimize heat flow
- ___ Identify electrical components and their functions

II. WORKPLACE SKILLS

Key:

- (1) Unsatisfactory
- (2) Needs Improvement
- (3) Meets Expectations
- (4) Exceeds Expectations

1. _____ Act as a responsible and contributing citizen and employee.

Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

2. _____ Apply appropriate academic and technical skills.

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

3. _____ Attend to personal health and financial well-being.

Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.

4. _____ Communicate clearly, effectively and with reason.

Career-ready individuals communicate thoughts, ideas and action plans with clarity, whether using written, verbal and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice and organization and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

5. _____ Consider the environmental, social and economic impacts of decisions.

Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organizations and the environment. They are aware of and utilize new technologies, understandings, procedures, materials and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and profitability of the organization.

6. _____ Demonstrate creativity and innovation.

Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

7. _____ Employ valid and reliable research strategies.

Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use a reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices. They use an informed process to test new ideas, information and practices in their workplace situation.

8. _____ Utilize critical thinking to make sense of problems and persevere in solving them.

Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem. They thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

9. _____ Model integrity, ethical leadership and effective management.

Career-ready individuals consistently act in ways that align to personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the direction and actions of a team or organization, and they apply insights into human behavior to change others' actions, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morale and organizational culture.

10. _____ Plan education and career path aligned to personal goals.

Career-ready individuals take personal ownership of their own educational and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the educational and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors and other experts to assist in the planning and execution of career and personal goals.

11. _____ Use technology to enhance productivity.

Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring and using new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks -- personal and organizational -- of technology applications, and they take actions to prevent or mitigate these risks.

12. _____ Work productively in teams while using cultural/global competence.

Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

I hereby certify that the technical skills listed above are true and correct and that the named student has successfully completed all technical skills identified. I also hereby certify that the student has received training in the workplace skills listed above. A copy of this completed employability profile has been provided to the student.

Instructor Name

Student Name

Instructor Signature

Date

Student Signature

Date