

# Engineering Design & Technology Competency Profile



## MECHANICAL ENGINEERING DESIGN:

- Demonstrates manual board skills
- Constructs ANSI line types and lettering
- Constructs architectural lettering per standards
- Produces mechanical parts drawings using orthographic views from solid models
- Produces working engineering drawings
- Produces mechanical detail drawings
- Produces mechanical assembly and sub-assembly drawings complete with bill of materials
- Produces sectional views on mechanical drawings
- Produces single, double auxiliary views and revolutions on mechanical drawings
- Develops sketches and pictorial drawings and representations of ideas
- Demonstrates proficient understanding and ability to construct isometric drawings
- Demonstrates proficient understanding and ability to apply basic geometric dimensioning and tolerancing symbology to mechanical drawings
- Demonstrates knowledge on ANSI threads
- Demonstrates knowledge on metric threads
- Demonstrates knowledge and understanding of basic geometric construction
- Demonstrates ability to build scale models from sketches and manufacturing drawings
- Demonstrates ability to construct various weldments, interpret weld symbols, and apply welding symbols to manufacturing drawings
- Demonstrates ability to interpret and construct various piping schematics per industry standards

## DIMENSIONING/MEASUREMENT:

- Demonstrates appropriate use and skill in dimensioning techniques per ANSI standards
- Demonstrates proficient understanding in limits and fits per ANSI standards
- Demonstrates proficient understanding of geometric dimensioning and tolerancing standards
- Demonstrates proficient understanding of English and metric measurement
- Demonstrates proficient understanding of English and metric conversions
- Demonstrates proficient understanding and use of scaling techniques on drawings
- Demonstrates proficient understanding and use of engineering, architectural, and civil scales

## MECHANICAL DESIGN SOFTWARE:

- Demonstrates proficient understanding/use of AutoCAD release 2022, SolidWorks 2022, and associated commands
- Demonstrates introductory knowledge of Inventor 2022
- Demonstrates ability to construct title blocks using AutoCAD 2022 using model space and paper space

- Demonstrates ability to produce a start drawing with all appropriate layers and colors used in manufacturing drawings using AutoCAD 2022
- Demonstrates ability to construct solid models using SolidWorks 2022 and Inventor 2022
- Demonstrates ability to construct parts drawings and assembly drawings from solid models using SolidWorks 2022 and Inventor 2022
- Demonstrates ability to construct and animate assemblies from solid models using SolidWorks 2022 and Inventor 2022

#### WORK ETHIC/SOFT SKILL SETS:

- Demonstrates teamwork skills and knowledge to maintain a safe working environment
- Demonstrates problem solving skills
- Demonstrates skill in performing tasks within a departmental management structure
- Participates and demonstrates skill in successful team projects

#### ENGINEERING PRINCIPLES:

- Demonstrates basic ability and knowledge of material strengths and uses
- Produced rapid prototype models from refined designs
- Demonstrates ability and knowledge to manipulate simple machines to determine force, work, torque and power
- Demonstrates basic introductory knowledge of computer numerical control (CNC) practices
- Demonstrates basic introductory knowledge of manual machining practices
- Demonstrates knowledge of hydraulic and pneumatic components and basic function
- Demonstrates knowledge of electrical schematics, components, and understanding of electrical theory
- Demonstrates ability to construct and interpret electrical, electronic diagrams
- Demonstrates knowledge of basic welding techniques in shop environment from a weldment drawing

#### ARCHITECTURAL ENGINEERING DESIGN:

- Demonstrates ability and knowledge to construct plumbing schematics in AutoCAD 2022 and Revit Architecture 2022
- Demonstrates ability and knowledge to construct electrical schematics in AutoCAD 2022 and Revit Architecture 2022
- Demonstrates ability and knowledge to interpret and construct contour topographical maps
- Demonstrates ability and knowledge to identify symbology on architectural floor plans
- Demonstrates ability and knowledge to construct architectural floor, elevation, foundation, and roof plans in Revit Architecture 2022 to a specified scale
- Demonstrates ability and knowledge to construct basic construction details on a complete set of plans in Revit Architecture 2022 to a specified scale
- Demonstrates ability and knowledge to construct three-dimensional renderings in Revit Architecture 2022
- Demonstrates ability and knowledge to construct model homes to specified scales

## INTRODUCTION TO DRONE TECHNOLOGY:

- Demonstrates adequate knowledge of Federal Aviation Administration part 107 testing data in the following categories:
  - FAA Regulations
  - Weather & Aviation Weather Reports
  - FAA Sectional Charts & various other chart data
  - Airport Operations & Symbols
  - Airspace Classifications
  - Loading & Performance
  - sUAS Operations, Maintenance & Emergency Procedures
- Demonstrates ability and knowledge to safely handle and fly small, unmanned aircraft systems (sUAS/drones)