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| **Erie High School** | | **Machine Trades Curriculum Map**  **CIP Code #48.0501** | | **Industry Standards**    **OSHA** |
| **1st Year** | **1st Quarter**  Orientation of Students  Intro and Understanding Importance of Shop Safety & Personal Protective Equipment (PPE)  Intro to Safety Data Sheets (SDS)  Intro to National Institute of Metalworking Skills (NIMS)  Intro toOccupational Safety and Health Administration (OSHA)  *CareerSafe OSHA 10 Hour Manufacturing*  *certification* online training (www.careersafeonline.com)  Math: Math Fundamentals, Fractions & Decimals | **2nd Quarter**  NIMS Intro to Machining (Section 1)  Careers in Manufacturing  NIMS Measurement, Materials & Safety (MM&S) (Section 2)  Understanding and Use of Rulers, Calipers and Other Measuring Equipment, Metallurgy and Inspection Process  Intro to Basic Blueprint Reading  Basic Inspection Procedures  *NIMS Certification Test* (*written only)* *to* *achieve Level 1: MM&S Certificate*  Math: Linear Measuring Methods | **3rd Quarter**  Use of Power Saws  Intro to Basic Blueprint Reading  Intro to NIMS CNC Lathe Operations  Safe Operations of CNC Lathes  Knowledge of Control Panel  Identification and Proper Use of Lathe Tooling  Lathe Process and Planning Procedures  *NIMS Credential Achievement Record (CAR) Activities check-list will earn Level 1: CNC Lathe Operator Skills Credential Program Certificate*  Math: Geometry--Lines, Angles, Triangles, Circles | **4th Quarter**  Use of Power Saws  Intro to Basic 2D Mill Blueprint Reading  Intro to NIMS CNC Mill Operations  Safe operations of CNC Mills  Knowledge of Control Panel  Identification and Proper Use of Mill Tooling  Milling Process and Planning Procedures  *NIMS Credential Achievement Record (CAR) Activities check-list will earn*  *Level 1: CNC Mill Operator Skills Credential Program Certificate*  Math: Applied Basic Math for Blueprint Calculations, Cartesian Coordinate system |
| **2nd Year** | **1st Quarter**    Shop Safety  Understanding Decimals and Fractions  Reading a Ruler  Understanding Basic Blueprint Reading  Understanding Layout Tools and How to Employ Them  Understanding Basic Inspection Tools and How to Employ Them  Safety on Horizontal Band Saw  Understanding and Operating the Horizontal Band Saw  Set Up Band Saw and Cut Work Piece  *NIMS Project Layout* | **2nd Quarter**  Safety on Manual Vertical Milling Machine  Understanding and Learning How to Operate the Vertical Milling Machine  Tram the Head of Vertical Milling Machine  Mount and Indicate Vise on Vertical Milling Machine  Differentiate Between Climb Milling and Conventional Milling  Square Block on a Vertical Milling Machine  Learn How to Check the Block for Square  *NIMS Project Bench Work* | **3rd Quarter**  Safety on Manual Lathe  Understanding and Learning to Operate the Lathe  Understanding and Indicating the Run Out on a Three-Jaw Chuck  Set Tool Height  Face End of Work Piece  Turning Outside Diameters on the Lathe  Center Drilling on the Lathe  Drilling a Hole on the Lathe  Safety on the Pedestal Grinder  Understanding of and Learning How to Sharpen Drills and Lathe Tools on the Grinder | **4th Quarter**  Appling Safety on the Drill Press and Milling Machine  Understanding the Drill Press  Learning About Hole Making on Drill Press and Milling Machine  Drill a Hole on the Drill Press  Counter Bore and Spot Face on Drill Press  Learn How to Edge Find and Locate the Center of a Hole on the Milling Machine  Drill a Hole on the Milling Machine  *NIMS Project Drill Press* |

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| **3rd Year** | **1st Quarter**  Shop Safety  Machine Maintenance on the Milling Machine  Identify Metals Classification  Apply Safety Procedures on the Milling Machine  Ream a Hole on the Milling Machine  Spot Face and Counter Bore on Milling Machine  Cut an Angle on the Milling Machine  Mill a Keyway on the Milling Machine  Introduction to Precision Inspection Tools  Understanding of Sine Plates and Sine Bars  Use Gage Blocks and Sine Plate to Check Milled Angle  Locate Position and Cut Slot on Vertical Milling Machine  *NIMS Project Manual Mill* | **2nd Quarter**  Apply Surface Grinder Safety Procedure  Understanding Advance Blue Print Reading  Understand and Operate a Surface Grinder  Dress Grinding Wheel  Grind Magnet Flat on the Grinder  Grind Two Sides Parallel  Grind a Slot  Grind a Keyway  Grind a Block Square  Grind Precision Angle  Apply Advanced Measuring Techniques  *NIMS Project Surface Grinder* | **3rd Quarter**    Safety on the Engine Lathe  Turn Part Between Centers  Cut Inside Diameter  Use Grooving Tool to Turn Groove in the Lathe  Cut Threads on Engine Lathe  Use a Die to Cut Threads in the Lathe  Use Go/No-Go Gage to Check Threads  Tap a Hole in the Lathe-Knurl on the Engine Lathe  *NIMS Project Turning Between Centers*  *NIMS Project Chucking in the Lathe* | **4th Quarter**  Advance Machining Methods on the Mill  Make 123 blocks and a Tool Maker’s Vise on the Mill  Advance Surface Grinding  Precision Grind the 123 blocks and the Tool Maker’s vise  *NIMS Project Surface Grinder* |
| **4th Year** | **1st Quarter**  Safe Operations of CNC Lathes  Knowledge of Control Panel  Identification and Proper Use of Lathe Tooling  Lathe Process and Planning Procedures  Programming- Using G & M Code  *From NIMS Blueprint Write a Program (Multi-Tool/Cycle) Using G & M Code for NIMS Project*  Prove Out & Edit Program on Simulator  Setting Work & Tool Offsets (Manually)  *CNC Turning: NIMS Certification Test (written)*  Math: Trigonometry- Intro to the Pythagorean Theorem | **2nd Quarter**  Develop a Process to Setup the Machine to Make NIMS Assignment  Mount Tooling Needed  Setting Offsets (Work & Tool) Manually  Make Necessary Offsets or Changes to Make Project for Inspection  *NIMS (Project): Use Program to Properly Setup Machine for Safe Operations to Manufacture Part Within Tolerance Given Specification & Achieve* *Level 1: CNC Turning Certificate*    Setting Offsets Using Work & Tool Probes and Machine Generated Macro (MGM)  Math: Trigonometry---solving angles | **3rd Quarter**  Safe Operations of CNC Mill  Knowledge of Control Panel  Identification and Proper Use of Mill Tooling  Process and Planning Procedures  Programming Using G & M Code  *Write a CNC Mill Program (Multi-Tool) for NIMS Project*  Prove Out & Edit Program on Simulator  Setting Work & Tool Offsets (Manually)  *CNC Mill: NIMS Certification Test (written)*  Math: Trigonometry- Sine, Cosine, Tangents | **4th Quarter**  Develop a Process to Setup the Machine to Make NIMS Assignment  Mount Tooling Needed in Holders  Setting Offsets (Work & Tool) Manually  Make Necessary Offsets or Changes to Make Project for Inspection  *NIMS (project): Use Program to Properly Setup Machine for Safe Operations to Manufacture Part Within Tolerance Given Specification & Achieve* *Level 1: CNC Milling Certificate*  Setting Offsets Using Work & Tool Probes and Machine Generated Macro (MGM)  Math: Trigonometry Sine Bar Applications |