**COURSE DESCRIPTION**

**Course Title:** Manufacturing

**Course Number:** 00921 (1 credit); 00922 (2-credits)

**Course Prerequisites:** None

|  |  |
| --- | --- |
| **Course Description:** | WCCC Manufacturing is an elective option available to ALL students in grade 10-12. WCCC Manufacturing provides students with an opportunity to participate in a student-run enterprise revolving around all aspects of manufacturing. Students have the option of taking this elective as a one-period/1 credit course or a two-period/2 credit course. Students will learn skills in CNC machining, engineering, marketing and accounting.  |

**Suggested Grade Level**: Grades 10-12

**Length of Course:** One Semester

**Units of Credit:** 1

 2 credits if taken for 2 periods**.**

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:**

Code: 2043 Machine Technology

To find the CSPG information, go to [CSPG](https://www.education.pa.gov/Educators/Certification/Staffing%20Guidelines/Pages/default.aspx)

**Certification verified by the WCSD Human Resources Department:** [x] Yes [ ] No

**WCSD STUDENT DATA SYSTEM INFORMATION**

**Course Level:** Academic

**Mark Types:** Check all that apply.

[x] F – Final Average [x] MP – Marking Period [x] EXM – Final Exam

**GPA Type**: [ ]  GPAEL-GPA Elementary [ ]  GPAML-GPA for Middle Level [x]  NHS-National

Honor Society

[x]  UGPA-Non-Weighted Grade Point Average [x]  GPA-Weighted Grade Point

 Average

**State Course Code**: 13203

To find the State Course Code, go to [State Course Code](https://nces.ed.gov/forum/sced.asp), download the Excel file for *SCED*, click on SCED 6.0 tab, and chose the correct code that corresponds with the course.

**TEXTBOOKS AND SUPPLEMENTAL MATERIALS**

**Board Approved Textbooks, Software, and Materials:**

**Title:**  Precision Machining Technology – 3rd Edition

**Publisher:** Skills

**ISBN #:**  9780357395127

**Copyright Date:** 2020

**WCSD Board Approval Date:** June 12, 2023

**Title:**  Reading for Machinists – 6th Edition

**Publisher:** Skills

**ISBN #:**  9781337810678

**Copyright Date:** 2019

**WCSD Board Approval Date:** June 12, 2023

**Supplemental Materials:** Student Workbook and Project Manual for Precision Machining 3rd edition – ISBN #: 97813377955319

**Curriculum Document**

**WCSD Board Approval:**

**Date Finalized:** 4/3/2023

**Date Approved:**  6/12/2023

**Implementation Year:** 2023-2024

**SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS**

The teacher shall make appropriate modifications to instruction and assessment based on a student’s Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

**Industry or Other Standards:**

**HAAS certification training**

**OSHA – CareerSafe**

|  |  |  |
| --- | --- | --- |
| **Performance Indicator** | **PA Core Standard and/or Eligible Content** | **Month Taught and Assessed for Mastery** |
| Justify the selection of a career. | 13.1.11D | Sept |
| Analyze and evaluate complex technical tasks using sophisticated processes. | 13.2.11B | All Year |
| Identify sources of health, safety and regulatory practices and their effect on the work environment. | 13.2.11D | Sept |
| Analyze Performance-based assessments components. | 13.2.11F | All Year |
| Analyze the need for manipulative/motor skills. | 13.2.11G | All Year |
| Analyze work habits needed to advance within a career. | 13.3.11A | Sept |
| Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations. | 2.3.11A | Sept-Oct |
| Demonstrate the ability to produce measures with specified levels of precision. | 2.3.11C | All Year |
| Present mathematical procedures and results clearly, systematically, succinctly and correctly. | 2.5.11C | All Year |
| Discriminate among the concepts of systems, subsystems, feedback and control in solving technological problems. | 3.1.10A | All Year |
| Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions. | 3.7.10A | Sept-Nov |
| Apply appropriate instruments and apparatus to examine a variety of objects and processes. | 3.7.10A | All Year |
| Evaluate appropriate instruments and apparatus to accurately measure materials and processes. | 3.7.12B | All Year |
| Utilize computer software to solve specific problems. | 3.7.12B | All Year |
| Read and understand essential content of informational texts and documents in all academic areas. | 1.2.11A | All Year |
| Maintain a written record of activities, course work, experience, honors and interests. | 1.4.11D | All Year |
| Listen to others. | 1.6.11A | All Year |
| **Orientation & Safety** |  |  |
| Describe the Occupational Safety and Health Administration (OSHA) and its role in the machining industry. | 101 | Sept |
| Identify and apply general safety precautions and procedures | 103 | Sept |
| Identify location of MSDS | 106 | Sept |
| **Performance Precision Measurement** |  |  |
| Care for precision instruments | 201-301-1001-1002 | All Year |
| Measure work on a surface plate. | 203 | All Year |
| Check work with an optical comparator. | 203 | All Year |
| Check work with plug & ring gages. | 203 | All Year |
| Check work with radius gauges. | 203 | All Year |
| Check work with a sine bar. | 203 | All Year |
| Layout work with combination square | 203 | All Year |
| Measure work with depth gages | 203 | All Year |
| Measure work with dial calipers. | 203 | All Year |
| Measure work with depth micrometer. | 203 | All Year |
| Measure work with gage blocks. | 203 | All Year |
| Measure work with height gages | 203 | All Year |
| Measure work with indicators. | 203 | All Year |
| Measure work with inside micrometer | 203 | All Year |
| Measure work with outside micrometer | 203 | All Year |
| Measure work with telescope and hole gauges. | 203 | All Year |
| **METALLURGY** |  |  |
| Identify & explain metals classifications. | 1101 | Sept-Nov |
| Identify & explain metal property applications. | 1102 | Sept-Nov |
| Identify & explain heat-treating processes. | 1103 | Sept-Nov |
| **USE OF CHARTS AND REFERENCES** |  |  |
| Use the decimal equivalent chart. | 1201 | All Year |
| Use speed and feed charts. | 1202 | All Year |
| Utilize thread charts. | 1203 | All Year |
| Demonstrate use of the Machinery's Handbook. | 1204 | All Year |
| **BLUEPRINT READING** |  |  |
| Identify & explain views and projections. | 1301 | Sept-Nov |
| Demonstrate basic sketching and dimensioning. | 1301 | All Year |
| Demonstrate basic sketching and dimensioning. | 1301 | All Year |
| Identify & explain lines, dimensions, tolerances, and fits. | 1303 | Sept-Nov |
| Calculate material sizes based upon job needs. | 1305 | All Year |
| Identify & interpret geometric dimensioning and tolerance. | 1303 | All Year |
| Identify & demonstrate use of Cartesian & polar coordinate systems. | 1404 | All Year |
| Demonstrate absolute & incremental positional. | 1409 | All Year |
| **CNC PROGRAMMING** |  |  |
| Demonstrate CNC safety procedures | 1401 | Sept |
| Demonstrate basic use of G & M codes. | 1402 | Sept |
| Demonstrate use of numerical controls. | 1402 | Sept-Oct |
| Identify & explain advantages & disadvantages of CNC machining. | 1401 | Sept |
| Demonstrate dry run of program. | 1406 |  |

|  |  |  |
| --- | --- | --- |
| Calculate & apply machine feeds and speeds. | 1411 | All Year |
| Set part zero and tool offsets. | 1409 | All Year |
| Post & transfer files to and from a CNC machine | 1411 | All Year |
| Identify and demonstrate use of MDI applications. | 1410 | All Year |
| **Accounting** |  |  |
| Analyze, journalize and post transactions to general & subsidiary ledgers. | 101-204 | All Year |
| Perform accounting functions using technology as a tool. | 608 | All Year |
| Identify, calculate and record depreciation, depletion and amortization. | 316 | ​​ All Year |
| Describe, calculate and journalize the sales and costs of sales including purchases, transportation costs, sales taxes and trade discounts. | 101-204-315-407-410 | All Year |
| Describe and explain the criteria used to determine expenses and journalize the expense transactions. | 101-203-204-503-504 | All Year |

**ASSESSMENTS**

**PSSA Academic Standards, Assessment Anchors, and Eligible Content:** The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

**Formative Assessments:** The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

**Effective formative assessments for this course include:** Analyzing student work, strategic questioning

Bell Ringers/POD

Discussions

Teacher observations/questioning

Outlining

**Summative Assessments:** The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

**Effective summative assessments for this course include:** Project bids, material completion, invoicing, CNC programing and marketing strategies.

Performance Assessments

ToolU on-line Assignments

Marking period assessments

Final Exam