Western Montgomery Career Technology Center

Metal Technology

CIP 48.0599

Student Competency List

Ranking:		**Name:**	
3	Task mastered	**Date:**	
2	Task performance average		
1	Task performance needs improvement		
0	Task performance - no exposure		

TASK NUMBER	STANDARDS AND OBJECTIVES	LEVEL 1 RATING	LEVEL 2 RATING	LEVEL 3 RATING
100	**Semester One**			
	Safety			
101	Identify fire exits and procedures			
102	Identifies first aid stations and known procedures			
103	Wears personal protection equipment as needed			
104	Identifies and understands shop-floor safety markings			
105	Identifies and understands danger and warning signs			
106	Identifies shop chemical areas and associated safety procedure			
107	Wears safe clothing, i.e. no loose or torn clothing, jewelry, loose hair, etc.			
108	Identifies special safety equipment such as ventilators, guards, etc.			
109	Knows proper method of lifting and carrying			
110	Understands that safety is an ongoing process requiring continual review			
111	Demonstrates the ability to work safely			
112	Demonstrates the ability to keep a clean and orderly work area			
100	**Semester One**			

	Hand Tools and Bench Work			
113	Identifies basic hand tools			
114	Uses tools safely and carefully			
115	Cuts material using a hacksaw			
116	Draw file a flat surface			
117	Uses a punch and chisel			
	Measuring Tools			
118	Use and read micrometer to +/- .0001			
119	Use and read inside micrometers to +/- .001			
120	Use and read dial calipers to +/- .001			
121	Use and read height gage to +/- .001			
122	Use a drill point gage			
100	**Semester One**			
	Blue Print Reading			
123	Identify the orthographic views on a print			
124	Identify isometric views			
125	List the essential elements found in the title block			
126	Determine the scale of the print			
127	Identify lines			
	Layout			
128	Prepare a work surface			
129	Apply layout fluid			
130	Demonstrate the use of the surface plate and angle plates			
131	Demonstrate the use of a solid steel square and combination se			
132	Demonstrate the use of various scribers			
100	**Semester One**			
	Materials			
133	Distinguish between ferrous and nonferrous materials			

	Cutting Fluids			
134	Identify and demonstrate the use of various cutting fluids			
	Sawing Machine			
135	Identify the major parts of the machine and attachments			
136	Set up and operate horizontal and vertical band saw			
137	Determine the type of material to be cut			
138	Layout materials for cutting			
139	Select the proper speed for the materials to be cut			
140	Setup and perform straight cut			
100	**Semester One**			
	Drilling Processes			
141	Center punch hole location			
142	Center drill hole			
143	Debar a hole			
	Lathe Operations			
144	Measure stock for operations			
145	Select proper holding devices			
146	Turn diameters to within drawing specs			
147	Face materials			
	Milling Operations			
148	Identify the major parts of the machine on both horizontal and vertical mil			
149	Measure parts to determine cuts			
100	**Semester One**			
	Milling Operations - Continued…			
150	Mill horizontal and vertical plane surfaces			
151	Perform end milling			
	Jigs and Fixtures			
152	Select the proper Jig or Fixture for a specific operation			

	Welding Competencies Layout			
153	Mark bending lines			
154	Mark cutting lines			
155	Layout straight lines			
	Welding Competencies Safety			
156	Understand the accident reporting system			
100	**Semester One**			
	Welding Competencies Safety - Continued…			
157	Understand proper safe shop procedures			
158	Safely uses welding equipment			
159	Adhere to safety in electric are welding			
160	Adhere to safety in MIG welding			
161	Use proper ventilation			
	Plasma Arc Cutting			
162	Demonstrate the ability to set up and cut steel using the plasma cutter			
	Shielded Metal Arc Welding			
163	Comprehend working with electric curren			
164	Comprehend electrical terms			
165	Identify welding machines			
100	**Semester One**			
	Shielded Metal Arc Welding - Continued…			
166	Classify welding equipment			
167	Identify personal equipment			
168	Identify shop equipment			
169	Identify welding current			
	Shielded Metal Arc Welding Flat			
170	Weld short stringer beads			
171	Weld long stringer beads			

	MIG Welding Process			
172	Comprehend types of metal transfer			
173	Set up MIG machine			
174	Set up wire feed mechanism			
100	**Semester One**			
	MIG Welding Process - Continued…			
175	Set up shielding gas			
	MIG Welding Process Flat			
176	Weld short stringer beads			
177	Weld long stringer beads			
178	Weld weaved beads			
179	Weld edge joints			
180	Weld lap joints			
181	Weld lap joints multi pass			
182	Weld square butt joint - open root			
183	Weld tee joints			
184	Weld tee joints multi pass			
185	Weld outside corner joint			
100	**Semester One**			
	MIG Welding Process Flat - Continued…			
186	Weld outside corner joint multi pass			
187	Weld single bevel, square butt, open root			
99	**Job Seeking/Job Keeping Skills**			
99.01	Explore your value system to determine how it affects your job performance			
99.02	Complete job application forms			
99.03	Prepare a resume			
200	**Semester Two**			
	Hand Tools and Bench Work			
201	Cuts internal thread			

202	Cuts external threads			
200	**Semester Two**			
	Measuring Tools			
203	Use and read depth micrometers to +/- .001			
204	Use and read bevel protractor			
205	Use radius gages			
206	Use a screw pitch gage			
207	Determine flatness with a dial test indicator			
	Blue Print Reading			
208	Determine the tolerance for a reference dimension			
209	Identify different types of dimensions			
210	Identify symbols and abbreviations			
211	Make a working sketch from a work piece			
200	**Semester Two**			
	Layout			
212	Demonstrate the use of various dividers, trammels and calipers			
213	Demonstrate the use of the surface gage and height gage			
	Materials			
214	Understand the material classification system			
	Mechanical Hardware			
215	Identify a screw thread's major, minor and pitch diameters			
216	Understand thread series, types of threads, class of fit, and identification			
	Sawing Machines			
217	Setup and perform angular cut			
218	Setup and perform contour sawing			
200	**Semester Two**			
	Sawing Machines - Continued…			

219	Setup and use power feed			
	Drilling Process			
220	Locate, drill, ream, and bore holes according to part specifications			
221	Understand proper setup procedures using clams, studs, t-bolts, vises, and other			
	Necessary equipment			
223	Calculate the proper speed and feed for drilling material			
224	Select proper tools to suit work requirements			
	Grinding Operations			
225	Setup and align fixtures and holding devices			
226	Understand the numbering system for grit sizes			
227	Select the proper grinder for the part			
200	**Semester Two**			
	Grinding Operations - Continued…			
228	Select the proper grinding wheel for the part			
229	Dress and true grinding wheels			
230	Inspect grinding wheels			
231	Perform exterior grinding			
232	Perform surface grinding			
233	Grind a part square and parallel on a surface grinder			
	Lathe Operations			
234	Align lathe centers			
235	Die cut threads with lathe, hand threading			
236	Hand tap threads on the lathe			
237	Counterbore holes			
238	Countersink holes			
200	**Semester Two**			
	Lathe Operations - Continued…			
239	Drill holes			
240	Ream holes			
241	Perform lathe filing			
242	Performing roughing and finish cuts on the lathe			

243	Setup and turn a part using a collet			
244	Setup and turn a part with a three jaw chuck			
	Milling Operations			
245	Align milling machine fixtures and tools			
246	Setup and align work and cutting tools			
247	Select and set speeds and feed			
248	Select the proper cutter for the part and operation to be performed			
249	Demonstrate the proper use of an edge finder			
200	**Semester Two**			
	Milling Operations - Continued…			
250	Locate and drill holes to within .001" of X, Y coordinate			
251	Drill blind hole to depth to within .005"			
252	Countersink holes			
253	Counterbore holes			
	Welding Competencies Layout			
254	Layout hole locations			
255	Trace Patterns			
	Shielded Metal Arc Welding			
256	Select proper electrodes			
257	Identify types of welds			
258	Identify parts of a weld			
200	**Semester Two**			
	Shielded Metal Arc Welding - Continued…			
259	Identify types of joints			
260	Understand direction of travel			
	Shielded Metal Arc Welding Flat			
261	Weld weaved beads			
262	Weld edge joints			
263	Weld lap joints			
264	Weld square butt joints			

265	Weld tee joints			
266	Weld tee joints multi pass			
267	Weld outside corner joint			
268	Weld single 'v' groove butt join			
200	**Semester Two**			
	Resistance Welding Process			
269	Set up resistance welding machine			
270	Spot weld mild steel			
271	Spot weld stainless steel			
272	Spot weld copper			
273	Spot weld aluminum			
	Oxy/Fuel Welding Process			
274	Safely set up equipment			
275	Safely light touch and achieves neutral flame			
276	Safely shut down torch and purge lines			
277	Weld beads without filler meta			
278	Weld beads with filler metal			
279	Weld square butt joints			
200	**Semester Two**			
	Oxy/Fuel Welding Process - Continued…			
280	Weld lap joints			
	Oxy/Fuel Manual Cutting			
281	Setup and identify equipment			
282	Light torch and achieve neutral flame			
283	Cut straight line			
284	Cut beveled line			
99	**Job Seeking/Job Keeping Skills**			
99.04	Write a cover letter			
99.05	Participate in a job interview			
99.06	Evaluate employer-employee relationship			

300	**Semester Three**			
	Review			
301	Safety review			
302	Equipment review			
	Print Reading			
303	Intro to print reading			
304	Measurement			
305	Alphabet of lones			
306	Title blocks and notes			
309	Dimmensioning			
310	Holes , threads, and fasteners			
311	Alternate views			
312	Symbols			
313	Types of welds			
300	**Semester Three**			
	Print Reading - Continued…			
314	Geometric tolerancing			
	Milling Operations			
315	Cut keyseats			
316	Perform form millin			
317	Perform gang milling			
318	Perform straddle milling			
319	Indexing operations			
320	Fly cutting			
	SMAW Vertical			
321	Weaved beads			
322	Edge joints			
300	**Semester Three**			
	SMAW Vertical - Continued…			

323	Lap joints			
324	Square butt joints			
325	Tee joints			
326	Tee joint multi pass			
327	Outside corner joint			
328	Single V groove butt joint			
	Precision grinding			
329	Inspect grinding wheels			
330	Select speeds and feeds			
331	Exterior grinding			
332	Cylindrical grinding			
333	Face grinding			
300	**Semester Three**			
	Precision grinding - Continued…			
334	Taper grinding			
	Sawing Machines			
335	Remove and replace saw blades			
336	Select jigs, fixtures, and holding devices			
337	Radius sawing			
338	Bevel sawing			
339	Select the proper blade for the material to be cut			
	Computer Numerical Control			
340	Define CNC components			
341	Define advantages of CNC			
342	Define X, Y, Z axis			
300	**Semester Three**			
	Computer Numerical Control - Continued...			
343	Define pregram zero			
344	Define absolute and incremental programming			
	Oxyfuel welding precess			

345	Weld corner joints			
346	Tee joints			
347	Brazing square butt joints			
348	Brazing corner joints			
349	Brazing lap joints			
350	Brazing tee joints			
	Gas Tungsten Arc Welding			
351	Setup and shut down power supply			
300	**Semester Three**			
	Gas Tungsten Arc Welding			
352	Prepare materials for welding			
353	Make stringer beads w/ aluminum			
354	Stringer beads w/ mild steel			
355	Stringer beads w/ stainless steel			
400	**Semester Four**			
	Print Reading			
402	Identify welding symbols			
403	Understands pipe weding symbols			
404	Constructs projects using basic blue prints			
400	**Semester Four**			
	Computer Numerical Control			
405	Understands coordinate measuring system			
406	Know basic language codes			
407	Write a program for a basic print			
	Gas Tungsten Arc Welding			
408	Make a tee joint on mild steel w/ filler rod			
409	Make a lap joint on mild steel w/ filler rod			
410	Make a square groove butt weld on aluminum			

411	Make a lap joint on aluminum			
412	Make a corner joint on aluminum			
413	Make a tee joint on aluminum			
400	**Semester Four**			
	Materials			
414	Understands the iron and steel making process			
415	Understands the heat treating process			
416	Describes hard facing and surface treatment			
417	Understands non-destructive testing concepts			
418	Examine corrosion and non-corrosion resistance of metals			
419	Understands the mechanical, physical, and chemical properties of metals			
	Mechanical Hardware			
420	Understands geometrical elements of a screw			
421	Identify unified , acme, and buttress threads			
422	Understands the use of keys, pins, and rings for assembly purposes			
423	Understand the function of screw threads in measuring tools			
424	Identify screw and bolt threads			
400	**Semester Four**			
	Mechanical Hardware - Continued…			
425	Identify various types of machine nuts			
426	Identify various types of washers			
427	Identify two types of pipe threads and the difference between them			
	Metallurgy			
428	Understand the structure of metals			
429	Understands the properties of metals			
430	Understands the importance of carbon in steel			
431	Mechanical properties of metals			
432	Understands the classification system of carbon steels			
433	Identify alloy steels			
434	Identify welding defects			

435	Understands residual stresses			
400	**Semester Four**			
	Quality Control			
436	The history of QC			
437	Classifications of QC			
438	Nondestructive testing techniques			
439	Other QC technique			
	Grinding Operations			
440	Set up and sharpen lathe tools and drill bits			
441	Setup and grind punches, chisels, and other hand tools			
442	Set up and grind square, flat and angular surfaces			
443	Setup and grind a slot			
444	Setup and grind surfaces using angle blocks			
445	Setup a grinder w/ a magnetic chuck			
400	**Semester Four**			
	Lathe Operations			
446	Select coolant and cutting oils			
447	Select speeds and feeds			
448	Turn inside and outside thread			
449	Bore holes			
450	Turn internal and external tapers			
451	Turn shoulders, corners, and grooves			
452	Perform lathe filing			
453	Perform knurling operations			
454	Part material w/ cut-off tool			
455	Turn angular and radii cuts			
	Measuring Tools			
456	Read a thread mic			
400	**Semester Four**			
	Measuring Tools - Continued			

457	Use telescoping and small hole gages			
458	Use thickness gage			
459	Use surface finish gages			
460	Use a speed indicator			
461	Use a U.S. Standard gage for sheet and plate			
462	Use dial test indicators in setup and measurement			
	Drilling Operations			
465	Spot face to specs			
466	Select proper tools for work requirements			
467	Select proper sleeves			
468	Tap holes to specs			
500	**Semester Five**			
	Safety Review			
501	Personal protection equipmen			
502	Shop safety			
503	equipment safety			
504	hand and power tool safety			
	Measuring Tools			
507	dial test indicator on a milling machine			
508	dial test indicator on a lathe			
509	checking for squareness			
510	checking for parallelism			
511	checking for roundness			
500	**Semester Five**			
	Print Reading for Welders			
515	alphabet of lines			
516	understanding print			
517	types of prints			
518	plane geometry			

519	welding symbols			
	Occupational Math			
525	review of fractions			
526	review of decimals			
527	conversions			
528	metric system			
500	**Semester Five**			
	Layout			
535	Marking lines on metal			
536	Squares			
537	Measuring angles			
538	Layout steps			
539	layout safety			
	CNC Introduction			
545	Positioning			
546	NC movement systems			
547	Programming NC machines			
	SMAW Horizontal			
550	carbon steel			
500	**Semester Five**			
	SMAW Horizontal - Continued…			
551	Stainless			
552	alloys			
	MIG Vertical			
555	carbon steel			
556	stainless			
557	aluminum			

	MIG Horizontal													
560	carbon steel													
561	stainless													
562	aluminum													
600	**Semester six**													
	MIG Overhead													
601	Carbon steel													
602	Stainless													
603	Aliminum													
	SMAW Overhead													
610	Carbon steel													
611	Stainless													
	TIG Stainless													
615	Flat position													
616	Vertical position													
617	Horizontal position													
600	**Semester six**													
	Oxyfuel Cutting Automatic													
620	Equipment setup													
621	Torch settings													
622	Operations													
	Oxyfuel Cutting Manual													
627	Cutting torch operation													
628	torch settings													
629	Operations													
	Oxyfuel Welding Vertical													
635	torch tip sizes													
636	adjusting the flame													

637	carbon steel			
600	**Semester six**			
	Oxyfuel Welding Vertical - Continued…			
638	stainless			
	CNC Programming			
645	Programming codes			
646	program writing process			
	CNC Milling			
650	Machine operation and setup			
651	Running a program			
	CNC Turning			
655	Machine operation and setup			
656	Running a program			