

Conventional Machine Operator Certificate  
Regional Consortium Second Read

**NORCO**  
COLLEGE

## **ITEM 1. OVERVIEW OF PROGRAM BEING PROPOSED.**

This is a 12-unit certificate designed to prepare students with basic entry-level machine operator skills, safety knowledge, theory and quality control skills in manufacturing processes. Students obtaining this certificate will qualify for the first level certification in National Industry Metal Skills (NIMS). This certificate prepares students for employment as a Conventional Machinists, Machine Operators, and/or Machine Tool Cutting Setters. We developed this certificate after collaboration and consultation with San Bernardino Valley College (SBVC) to ensure our curriculum would align.

### Department Program Goals and Objectives

Upon successful completion of this program, students should be able to:

- Demonstrate aptitude in safely setting up and operating the lathe, mill, drill press, saw and grinder.
- Demonstrate use of gages (gage blocks and pins), calculate angles for work setup, utilize the proper precision measuring tools when machining.
- Create parts specified by the National Institute of Metalworking Skills (NIMS) using conventional machining.
- Establish a systematic approach to recognize the essential information given on a blueprint.
- Apply safety in a machine shop environment utilizing Occupational Safety and Health Act (OSHA) and National institute for Metalworking Skills (NIMS) standards.
- Properly maintain equipment to industry specifications.
- Prepare a part for NIMS bench and layout certification
- Basic machine shop practices, with an emphasis on, basic shop mathematics, measurements, and the correct use of the basic machine tools, mills, lathes, saws, drill presses, and instruction to National Institute for Metalworking Skills (NIMS) Standards Level I, Bench and Layout.

## **ITEM 2. CATALOG DESCRIPTION**

### SHORT DESCRIPTION of PROGRAM

This certificate is designed to prepare students with basic entry-level machine operator skills, safety knowledge, theory and quality control skills in manufacturing processes. Students obtaining this certificate will be prepared to take the first level certification exam in National Industry Metal Skills (NIMS). This certificate prepares students for employment as a Conventional Machinists, Machine Operators, and/or Machine Tool Cutting Setters.

### DESCRIPTION of COURSES

#### **MAN-38: General Machine Shop**

##### COURSE DESCRIPTION

Prerequisite: None.

This introductory course instructs students in the basic setup and operating of the lathe, mill, saw, drill press and grinder. Safety, blueprint reading, measurement, shop math, tool grinding, and speed and feed calculations also included.

### **ENE-42: SolidWorks I**

#### **COURSE DESCRIPTION**

Prerequisite(s): None.

Advisory: PC computer experience recommended.

This course is designed to introduce the student to three-dimensional parametric solid modeling with SolidWorks. Students will begin with basic parametric solid modeling techniques advancing into complex assemblies requiring animation. 27 hours lecture and 90 hours of laboratory.

### **ENE-51: Blueprint Reading**

#### **COURSE DESCRIPTION**

Prerequisite: None.

A beginning course in the study of blueprints and their interpretation, types of projection, symbols and abbreviations. This course is designed for students interested in print reading for the machine trades. 27 hours lecture and 27 hours laboratory. (Letter Grade, or Pass/No Pass option.)

### **MAN-39: Machine shop theory**

#### **COURSE DESCRIPTION**

Prerequisite: None.

The basic cutting concepts of machine tools are described and applied emphasizing safe work practices and rules related to machine tool operations. Emphasis will be on the fundamentals of bench work and layout related to the National Institute for Metalworking Skills (NIMS) Standards.

### **MAN-55: Occupational Safety and Health Administration (OSHA) Standards for General Industry**

#### **COURSE DESCRIPTION**

Prerequisite: None.

Covers OSHA policies, procedures, and standards, as well as safety for general industry and health principles. Topics include scope and application of the OSHA general industry standards. Special emphasis is placed on those areas that are the most hazardous, using OSHA standards as a guide. Upon successful course completion, the student will receive either an OSHA 10 or 30 hour general industry or construction industry training completion card. 36 hours lecture. (Letter Grade, or Pass/No Pass option.)

### ITEM 3. PROGRAM REQUIREMENTS

Complete all of the following courses (12 units):

<u>Required Courses</u>		<u>Units</u>
<b>MAN-38</b>	<b>General Machine Shop</b>	<b>3</b>
<b>ENE-42</b>	<b>SolidWorks I</b>	<b>3</b>
<b>ENE-51</b>	<b>Blueprint reading</b>	<b>2</b>
<b>MAN-39</b>	<b>Machine shop theory</b>	<b>2</b>
<b>MAN-55</b>	<b>OSHA Standards for General Industry</b>	<b>2</b>
<b>Total Units:</b>		<b>12</b>

### ITEM 4. MASTER PLANNING

The Conventional Machine Operator program aligns with the master plan and mission of the college. The mission statement is as follows:

*Norco College serves our students, our community, and its workforce by providing educational opportunities, celebrating diversity, and promoting collaboration. We encourage an inclusive, innovative approach to learning and the creative application of emerging technologies. We provide foundational skills and pathways to transfer, career and technical education, certificates and degrees.*

The Conventional Machine Operator program aligns closely with the college's mission by providing educational opportunities to our community. The program provides individuals with up-to-date knowledge of the manufacturing industry using a combination of hands on learning and traditional classroom activities. Students will also have the benefit of completing a training aligned with National Industry Metal Skills (NIMS) standards, a third party credential. This will enhance our student's pursuit of gainful employment while continuing their education.

After successful completion of the Conventional Machine Operator program, students will possess skills for an entry-level Conventional Machine Operator position. This is a high paying field that is in demand. According to Labor Market Information, the median annual wage for a Machinists is \$31,642.

Norco College has already established a partnership with Corona-Norco Unified School District, Moreno Valley Unified School District, and Riverside Unified School District, among others. This partnership, built by the CCPT (California Career Pathways Trust) grant, will be used to encourage concurrent enrollment in the Conventional Machine Operator program. This partnership will create an awareness of this in-demand career pathway in Manufacturing Technology and create a pipeline of students for future courses.

Once approved, this program will be incorporated into the Program Review process. This process will review relevancy, curriculum outlines and student success on an annual basis. The process strategically aligns program review, strategic planning, and resource allocation aligning with accreditation standards. The responsibility for this program review will fall with the department chair and the Business, Engineering, and Information Technology department.

Faculty and local employers recommend courses that provide entering workers with the foundational skills and knowledge to facilitate innovation and keep pace with technological change. The 2014 Labor Market Information forecasts a significant growth of in Machine Operator related positions through 2022. This growth will result in 4,520 jobs in California. Compared to 2012 labor market data, this growth results in an additional 350 jobs. Additionally, annual forecasts project an average of 141 (new and replacement) Machine Operator related jobs. Every effort to provide students with programs to meet the current and future demands of Manufacturing Technology are being made. The courses leading to this certificate provide the framework needed in order for students to be prepared for entrance directly into the field of Manufacturing Technology. According to the LMI data, employers prefer to hire someone with technical/vocational training, such as a community college certificate or other postsecondary training in Manufacturing Technology. Providing this certificate at Norco College will meet the identified program needs of students seeking employment in manufacturing technology.

Norco College has identified gaps in the existing Manufacturing Technology curriculum, which lack some foundational courses specific to Machinist and Machine Operators. Because of these curricular gaps, Norco College took steps to align courses with a well-established Machine Operator program offered at SBVC. Offering this program at Norco College will greatly benefit students seeking employment in Manufacturing Technology without prior work experience. Having a specific pathway of courses leading to this certificate is critical to improving the academic success of our students wishing to pursue a career in Manufacturing Technology. We will not need additional funding for facilities or resources at this time. We will be able to utilize funding from CTE Enhancement Funds for needed instructional equipment. We will also leverage funds from both the TAACCCT grant and CCPT (California Career Pathways Trust) grant for items such as faculty professional development and laboratory equipment.

In addition, Norco College, local high school and employers in our service district within Riverside County have been working in partnership to develop a program to educate/train our local residents (high school and college level) to fill Conventional Machine Operator employment needs. Partnerships are underway, led by the CCPT (California Career Pathways Trust) and TAACCCT grants, to increase career pathways and concurrent enrollment within the field of Manufacturing. Norco College has coordinated various campus tours and faculty-lead presentations with local high schools to educate their students about their option to leverage concurrent enrollment during Spring, Summer, and Fall terms (2014-2016). Due to this new partnership, the Conventional Machine Operator program will be available to partnering high schools for concurrent enrollment, which will provide a seamless transition from high school into the community college system. This will accelerate student's pathway into entry-level work and decrease the amount of time they spend completing a certificate and/or an Associates Degree program. We have already started utilizing this model for various other certificate programs, including Industrial Automation, beginning last year and it has proven to be an effective method to engage high school students in CTE classes.

There is not local competition for this award. In fact, this new certificate is part of a regional effort lead by participating TAACCCT grant awardees to align programs and curriculum in the local region. Ultimately, the program alignment benefits our students in our area as being

aligned to San Bernardino Valley College’s curriculum in a similar program. As our enrollment has proven, many students do not take classes at a single community college. Many students have employment and personal obligations outside their home city limits that may require a commute. Thus, students may enroll at multiple colleges (including SBVC, and Norco) to increase course availability. Offering an aligned program at multiple colleges will allow students additional options and greater flexibility for obtainment of their CTE certificate.

**Item 5. Enrollment and Completer Projections**

CB01: Course Department Number	CB02: Course Title	2013-2014		2014-2015	
		Annual # Sections	Annual Enrollment Total	Annual # Sections	Annual Enrollment Total
MAN-38	General Machine Shop	N/A	N/A	N/A	N/A
ENE-42	SolidWorks I	4	113	4	95
ENE-51	Blueprint reading	2	82	2	62
MAN-39	Machine shop theory	N/A	N/A	N/A	N/A
MAN-55	OSHA Standards for General Industry	1	20	2	40

The need for this program is supported by the net increase in labor demand over the next 6 years. According to LMI data it is projected that there will be an annual average increase of 141 Machine Operator related openings. Furthermore, LMI data projects an increase in net jobs from 2012 to 2022. Therefore, 350 additional Conventional Machine Operator related jobs will be available compared to 2012.

**ITEM 6. PLACE OF PROGRAM IN CURRICULUM/SIMILAR PROGRAMS**

*a) Do any active inventory records need to be made inactive or changed in connection with the approval of the proposed program? If yes, please specify.*

No, while this is a new program of study, it is actually a subset of existing State Approved programs in the Manufacturing area that are currently being taught at Norco College.

*b) Does the program replace any existing program(s) on the college’s inventory? Provide relevant details if this program is related to the termination or scaling down of another program(s).*

No, the program will not replace any existing program. In the “Catalog Rights” section of the Norco College 2015-2016 Catalog, it states that students may choose to have classes applied under new or older programs, assuming continuous enrollment. So, it is logical to assume that some students, who already have taken qualifying courses, that will be in the new Conventional Machine Operator Program, once approved, may wish to have those courses applied toward the new program.

*c) What related programs are offered by the college?*

Norco College currently offers Computer Numerical Control (CNC) Programming certificate program and Computer Aided Production certificate program. The Conventional Machine Operator program differs from the CNC Programming and Computer Aided Production certificates as it focuses on basic entry-level machine operator skills, safety knowledge, theory and quality control skills in manufacturing processes. This programs serves as a foundation of more advanced manufacturing technology programs, such as CNC and Computer Aided Production. In contrast, the CNC program focuses on how parts are produced in industry using Computer Numerical Control Machines and Computer Aided Machine programming systems. The Computer Aided Production program teaches students how to design and carry out the operations needed to make machined products that meet precise specifications.

The new Conventional Machine Operator program will be housed in the CACT Building at Norco College. Norco College has never had a program specifically focused on Conventional Machining. Courses in the new program will be offered through the Manufacturing Technology Department. Courses will be scheduled during the day and evening. Students will be recruited from existing Manufacturing Technology courses, community agencies, America's Job Center of California (AJCCs), local high schools and potential students who attend ongoing ACE (Accelerated Certificate & Employment) program Info Sessions.

The Conventional Machine Operator Certificate will fulfill the skills gap for CNC Programming and Computer Aided Production students as they pursue employment in the Manufacturing Technology field. Pending all approvals, this certificate will be placed in the 2016-2017 Norco College Catalog under Manufacturing Technology along with our currently offered certificates in Manufacturing Technology: Computer Numerical Control (CNC) Programming, Industrial Automation, Computer-Aided Production Technology, and Supply Chain Technology.

**ITEM 7. SIMILAR PROGRAMS AT OTHER COLLEGES IN THE SERVICE AREA THE FOLLOWING IS A LIST OF SIMILAR CERTIFICATES, AS LISTED IN THE CURRICULUM INVENTORY:**

This program falls under TOP Code **0956.30**.

The only other similar certificate program with this same TOP code and within the Inland Empire within is San Bernardino Valley College's Basic Machine Operator certificate program. In fact, San Bernardino Valley College has an identical program. We met with their faculty and administration prior to developing this certificate. Our goal was/is to ensure seamless transferability between Norco College and SBVC for the benefit of our region. This collaboration is also a part of our regional TAACCCT grant and our regional, forthcoming Intech Center. Their certificate program at SBVC is also 12 units. Norco College acknowledges and thanks the faculty and administration at SBVC for their collaboration and collegiality in aligning our programs.

According to the CCCC Data Mart Program Awards Summary Report for certificates requiring 6 to < 18 units (shown below), there were 2 completers from the 2013-2014 academic year and 4 completers from the 2014-2015 academic year. In addition, given the geographical distance between colleges and the high labor market demand in the Inland Empire, there is no projected

adverse effect by the creation of this program. We do not believe, given our geography, that this program will adversely impact SBVC, moreover, Norco College has always had CNC Programming and Computer-Aided Production programs. This merely increases our capacity to also train on manual machines. It will also benefit Norco College students, many of whom already commute great distances to attend Norco. This is particularly true for those who commute from the south and the east of Norco College. Many of our students come from such places as the Lake Elsinore and San Jacinto areas to study with us.

	Annual 2013-2014 Award Count	Annual 2014-2015 Award Count
Machining and Machine Tools-095630	3	5
▣ Riverside CCD Total	1	4
▣ Associate of Science (A.S.) degree Total		2
Machining and Machine Tools-095630		2
▣ Certificate requiring 18 to < 30 semester units Total	1	2
Machining and Machine Tools-095630	1	2
▣ San Bernardino CCD Total	5	13
▣ Associate of Science (A.S.) degree Total	2	3
Machining and Machine Tools-095630	2	3
▣ Certificate requiring 18 to < 30 semester units Total	1	6
Machining and Machine Tools-095630	1	6
▣ Certificate requiring 6 to < 18 semester units Total	2	4
Machining and Machine Tools-095630	2	4
▣ San Diego CCD Total	29	93
▣ Associate of Science (A.S.) degree Total	6	7
Machining and Machine Tools-095630	6	7
▣ Certificate requiring 30 to < 60 semester units Total	4	15
Machining and Machine Tools-095630	4	15
▣ Certificate requiring 18 to < 30 semester units Total	10	14
Machining and Machine Tools-095630	10	14

In addition, Norco College and San Bernardino Valley College (SBVC) offer several advanced Manufacturing Technology certificate and degree programs. These programs range from 12 to 60 units. We have even suggested that some students can be well-served by continuing their education where they can take more advanced Machinist certificate and associate programs. This will enhance our student’s ability to further their education in a CTE program, increasing their earning potential.

**ITEM 8. SUPPORTING DOCUMENTATION**

**Labor Market Information (LMI) Analysis**

The growth within these counties will call for a higher number of individuals certified as Conventional Machine Operator. LMI is pasted below for all related SOC. This certificate primarily will prepare residents for SOC **51-4041** (Machinists), **51-4034** (Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic), and **51-4081**(Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic).

Employment Development Department Labor Market Information Division Published: December 2014		2012-2022 Occupational Employment Projections Riverside-San Bernardino-Ontario Metropolitan Statistical Area (Riverside and San Bernardino Counties)												
SOC Code*	Occupational Title	Estimated Employment 2012**	Projected Employment 2022	Numeric Change 2012-2022 [1]	Percent Change 2012-2022	Annual Average Percent Change	Average Annual Job Openings			2014 First Quarter Wages [5]		Education and Training Levels [7]		
							New Jobs [2]	Replacement Needs [3]	Total Jobs [4]	Median Hourly	Median Annual	Entry Level Education	Work Experience	On-the-Job Training
00-0000	Total, All Occupations	1,276,500	1,523,600	247,100	19.4%	1.9%	25,235	30,375	55,610	\$16.34	\$34,002			
49-0000	Installation, Maintenance, and Repair Occupations	48,730	59,600	10,870	22.3%	2.2%	1,090	1,140	2,230	\$21.11	\$43,918			
49-9041	Industrial Machinery Mechanics	1,780	2,380	600	33.7%	3.4%	60	51	111	\$25.00	\$51,999	7	None	LT OJT
49-9043	Maintenance Workers, Machinery	860	980	120	14.0%	1.4%	12	11	23	\$20.40	\$42,412	7	None	MT OJT
49-9044	Millwrights	140	200	60	42.9%	4.3%	6	2	8	\$19.92	\$41,424	7	None	APP
49-9071	Maintenance and Repair Workers, General	10,350	11,930	1,580	15.3%	1.5%	158	199	357	\$18.24	\$37,933	7	None	LT OJT
51-0000	Production Occupations	68,700	72,130	3,430	5.0%	0.5%	514	1,360	1,874	\$13.51	\$28,096			
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	650	750	100	15.4%	1.5%	10	18	28	\$17.38	\$36,155	7	None	MT OJT
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	160	210	50	31.3%	3.1%	5	5	10	\$25.85	\$53,760	7	None	LT OJT
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	1,350	1,250	-100	-7.4%	-0.7%	0	12	12	\$13.81	\$28,745	7	None	MT OJT
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	580	540	-40	-6.9%	-0.7%	0	13	13	\$13.39	\$27,841	7	None	MT OJT
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	400	350	-50	-12.5%	-1.3%	0	8	8	\$16.74	\$34,824	7	None	MT OJT
51-4035	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	240	220	-20	-8.3%	-0.8%	0	4	4	\$15.15	\$31,500	7	None	MT OJT
51-4041	Machinists	3,370	3,840	470	13.9%	1.4%	48	77	125	\$15.22	\$31,642	7	None	LT OJT
51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	400	330	-70	-17.5%	-1.8%	0	8	8	\$14.32	\$29,792	7	None	MT OJT
51-4111	Tool and Die Makers	260	270	10	3.8%	0.4%	1	2	3	\$25.24	\$52,500	7	None	LT OJT
51-4199	Metal Workers and Plastic Workers, All Other	510	540	30	5.9%	0.6%	3	6	9	\$13.67	\$28,430	7	None	MT OJT
51-7041	Sawing Machine Setters, Operators, and Tenders, Wood	400	410	10	2.5%	0.3%	1	11	12	\$12.92	\$26,865	7	None	ST OJT
51-7042	Woodworking Machine Setters, Operators, and Tenders, Except Sawing	590	570	-20	-3.4%	-0.3%	0	3	3	\$14.13	\$29,396	7	None	ST OJT

**Secondary and ROP feeder districts in the college's service area.**

District	Feeder classes/programs currently being offered
Lake Elsinore USD	Intro to Manufacturing

The plan for coordination with feeder districts is to build the CTE pipeline for this program. This program is part of our regional CCPT (California Career Pathways Trust) grant. We will work to articulate the General Machine Shop class with any regional high school which properly aligns.

## Manufacturing Industry & Advisory Council

### May 01, 2015

#### Attendees:

Paul VanHulle, Norco College Faculty

Cathy Cary, Vocademy

Gene Sherman, Vocademy

Rick Pettit, California Steel Industries Inc.

Ron Taetsvanamerogen, California Steel Industries Inc.

Greg Eschborn, MotionWorx Corp.

Craig Hardin, Adaptive Technologies (Navy Surface Warfare Center)

Brenda Johnson, Precise Aerospace Manufacturing, Inc. Linnie Bailey, CNUSD

Katie Sales, Crest Steel

Jeff Michaels, Asturies Manufacturing

Josh Sprague, Hoosier

Pat Maluso, Western Hydrostatics

Anthony Lang, Norco College Student, Scribe

#### Drafting

- Drawings are mostly done in CAD software but table drafting is still needed for rapid revisions on site (this is in regards to the question of whether or not we should be teaching board drafting on campus). This question mostly pertains to the ENE department.
- Blueprint reading and GDT courses are deemed extremely relevant to manufacturing technologies.
- Naval Surface Warfare Center recommends Metrology class.
- Possibly taught by an instructor from their facility

#### CNC Programing

- Consider a SolidCAM course
- Consider extending MasterCAM into Summer/Winter semesters to teach 5<sup>th</sup> Axis programming. In other words the Mastercam course should be lengthened or we should go back to teaching MAN 52 and MAN 53. We will be better to make a decision once the class ends for this semester.
- Manual CNC Programming is still relevant to repair any issues created by
  - CAM Software generated code
- There is a need for Machinists with a Welding certification from the American Welding Society as well as machining experience
- There is also a need for a more basic machining program without CNC Programming. A smaller program is preferred to get residents to work quickly.
  - The group agreed this new certificate program is recommended.

#### CAD/CAM Software

- Discuss with instructors requiring a prerequisite of a computer proficiency

(through Webadvisor?) course/test for:

- Man-35 MasterCAM
- ENE-30 AutoCAD
- ENE-42 Solidworks
- SolidCAM Course if added
- Prerequisite course can benefit the above courses so that advanced students don't feel that they are being pulled down by students that don't have enough computer experience. We have tried to have prerequisites on these courses but often times found that it was a barrier to entry for these courses.

#### Automated Systems

- Should the Automated Systems Technician program be renamed Industrial Automation to reflect the changing terminology of the industry?
  - o It would be fine to change the name of these programs. Approved
- If the group decides that it should, two program pathways *Automated Systems Technician* and *Supply Chain Technology* would reside under the Industrial Automation program.
  - o The group states that this would be acceptable. Approved to merge 2 programs.
- Do we need to include welding content in the Automated Systems/Supply Chain Technology pathways?
  - o The group had a strong stance on this and even suggested that CNC operators have just some introductory experience in welding.