

Norco College
2012-2013 Catalog Addendum



This addendum to the 2012-2013 Norco College Catalog contains changes that offer new educational opportunities for students. These updates were approved after the 2012-13 Catalog went to press.

Although every effort has been made to ensure accuracy of the information, students and others who use the catalog and addendum should consult with a counselor, dean, department chair or program director for any additions, deletion or changes.

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NEW STATE APPROVED CERTIFICATE/DEGREES

COMPUTER NUMERICAL CONTROL PROGRAMMING

NAS655/NCE655

This program prepares individuals for an entry level career in computer numerical control programming. Computer control programmers and operators use computer numerically controlled (CNC) machines to cut and shape precision products, such as automobile, aviation, and machine parts. CNC machines operate by reading the code included in a computer-controlled module, which drives the machine tool and performs the functions of forming and shaping a part formerly done by machine operators. CNC machines include machining tools such as lathes, multi-axis spindles, milling machines, laser cutting machines, and wire electrical discharge machines. CNC machines cut away material from a solid block of metal or plastic—known as a workpiece—to form a finished part. Computer control programmers and operators normally produce large quantities of one part, although they may produce small batches or one-of-a-kind items. They use their knowledge of the working properties of metals and their skill with CNC programming to design and carry out the operations needed to make machined products that meet precise specifications.

CNC programmers—also referred to as *numerical tool and process control programmers*—develop the programs that run the machine tools. They review three-dimensional computer aided/automated design (CAD) blueprints of the part and determine the sequence of events that will be needed to make the part. This may involve calculating where to cut or bore into the workpiece, how fast to feed the metal into the machine, and how much metal to remove.

Certificate Program

Program Learning Outcomes

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

- Create a steam or stirling engine based on blueprints that involves parts using both the mill and the lathe.
- Create five-axis part drawing files using Computer Aided Manufacturing program such as Mastercam, numerical code files and Solid Works.
- Compose written assignments on occupation safety in general industry.
- Solve mathematical formulas by using unknowns and apply this knowledge to solve problems for the industry.
- Establish a systematic approach to recognizing the essential information given on a blueprint.

In addition to achieving the program learning outcomes for the Computer Numerical Control programming certificate, students who complete the Associate in Science Degree in Computer Numerical Control Programming (CNC) technology will demonstrate proficiency in general education student learning outcomes and proficiency in subject matter student learning outcomes.

Required Courses (29 units)		Units
ENE-30	Computer Aided Drafting (CAD)	3
ENE-42	SolidWorks I	3
ENE-51	Blueprint Reading	2
ENE-52	Geometric Dimensioning and Tolerancing	2
ENE-60	Math for Engineering Technology	3
MAN-52	Computer-Aided Manufacturing-Mastercam	4
MAN-53	Advanced Computer-Aided Manufacturing	3
MAN-55	Occupational Safety and Health Administration (OSHA) Standards for General Industry	2
MAN-56	CNC Machine Set-up and Operation	4
MAN-57	CNC Program Writing	3

Associate in Science Degree

The Associate in Science Degree in Computer Numerical Control Programming will be awarded upon completion of the degree requirements, including general education and other graduation requirements as described in the college catalog.

DIGITAL ELECTRONICS**NAS656/NCE656**

The Digital Electronics Program first prepares students with the fundamental theories of DC and AC electronic components, circuits & behaviors. It then grows to emphasize digital integrated circuit logic, analysis, design, mapping & simplification, and then culminates in microcontroller construction and programming. Printed Circuit Board (PCB) design will follow from schematic capture and circuit simulations. Students will learn to communicate, verbally and graphically, to a wide range of audiences, using various media and delivery methods. Completers of this program may qualify for a certificate, an Associate in Science Degree, or an entry level position in the Digital Electronics Industry, as knowledgeable and productive employees.

Certificate Program**Program Learning Outcomes**

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

- Fluently read and write electronic symbols of schematics, and develop schematic diagrams to guide the simulation, construction, maintenance, troubleshooting or repair of DC, AC, microcontrollers & digital circuits.
- Explain the operation of electronic components and predict their behavior in given circuit designs, and calculate solutions to complex networks, and justify the formulas and calculations.
- Capture a schematic of a mixed-signals circuit, using the appropriate electronics computer-aided-design (CAD) software, and simulate the behavior of it, and then create a PCB design for that circuit. Then, after fabrication of a Printed Circuit Board (PCB), “stuff” and solder components to it, test and contrast with simulation predictions.
- Fluently read and write Boolean Algebra logic equations, symbols, truth-tables and circuits, then synthesize logic forms, simplify to lowest terms, and implement circuits using only NAND or NOR logic gates.
- Design, program, compile, install, wire, test, verify and explain the proper operation of a microcontroller with respect to given specifications, then explain the purpose and methods whereby a microcontroller may perform math, logic or conversions between analog and digital forms.

<u>Required Courses (29 units)</u>		<u>Units</u>
ELE-11	DC (Direct Current) Electronics	4
ELE-13	AC (Alternating Current) Electronics	4
ELE-25	Digital Techniques	4
ELE-26	Microprocessors and Microcontrollers	4
ENE/ELE-27	Technical Communications	3
ELE-28	MultiSim CAD & PCB Design/Fab	3
Electives	Choose from the list below	7

<u>Electives (7 units)</u>		
ELE-10	Survey of Electronics	4
ELE-23	Electronic Devices and Circuits	4
ELE/MAN-61	Introduction to Robotics	3
ELE/MAN-63	LabView Visual Programming for Automated Systems	3
ELE/MAN-64	Programmable Logic Controllers	3
ELE-91	Fundamentals of Solar Energy	3
ELE-200	Electronics, Work-Experience	1-4
MAN-55	Occupational Safety and Health Administration (OSHA) for General Industry	2

Associate in Science Degree

The Associate in Science Degree in Digital Electronics will be awarded upon completion of the degree requirements, including general education and other graduation requirements as described in the college catalog.

SUPPLY CHAIN TECHNOLOGY**NAS608/NCE608**

Supply Chain Technologies such as Radio Frequency Identification (RFID), Geographic Information Systems (GIS) and Global Positioning Systems (GPS) are the critical technologies related to logistics. Logistics is the management of the flow of goods and services between the point of origin and the point of consumption in order to meet the requirements of customers. The Supply Chain Technology Certificate/Associate of Science degree prepares students for immediate entry or promotion within the Supply Chain/Warehousing/Transportation industry in a variety of roles such as Supply Chain Technician, designer of equipment to support operations within the supply chain. This program provides students with the theoretical knowledge and hands on training necessary to function as part of an interdisciplinary team in the creation of mechatronic equipment used in the supply chain.

Certificate Program**Program Learning Outcomes**

Students will demonstrate proficiency sufficient to apply for and obtain entry-level employment in the field of Supply Chain Technology by compiling a portfolio of their work, which will include:

- Application of routing problems and algorithms related to transportation and delivery of goods and services;
- Description of the role of transportation in the economy and supply chain using ArcGIS;
- Application of Programmable Logic Control (PLCs) and Radio Frequency Identification systems to design, configure and drive conveyor belt systems.
- Compose written assignments on occupation safety in general industry on an advanced level to help companies prevent industrial accidents;
- Formal presentations as required by technicians working the field of supply chain technology.

In addition to achieving the program learning outcomes for the Supply Chain Technology certificate, students who complete the Associate of Science Degree in Supply Chain Technology will demonstrate proficiency in general education student learning outcomes and proficiency in subject matter student learning outcomes.

<u>Required Courses (25-29 units)</u>		<u>Units</u>
SCT-2	Supply Chain Technology Analysis and Models	3
SCT-3	Supply Chain Technology	4
SCT-4	Transportation Technology and Vehicle Routing	3
ELE/ENE-27	Technical Communications	3
ELE/MAN-64	Programmable Logic Controllers	3
MAN-55	OSHA Standards for General Industry	2
MAN-60	Hydraulic/Pneumatic Systems	3
Electives	Choose either Option A or B	4- 8
<u>Option A (4 units)</u>		
ELE-10	Survey Electronics	4
OR		
<u>Option B (8 units)</u>		
ELE-11	DC Electronics	4
ELE-13	AC Electronics	4

Associate in Science Degree

The Associate in Science Degree in Supply Chain Technology will be awarded upon completion of the degree requirements, including general education and other graduation requirements as described in the college catalog.

CERTIFICATE/DEGREE MODIFICATIONS

COMMERCIAL MUSIC

COMMERCIAL MUSIC: PERFORMANCE

NAA645/NCE645

The *Commercial Music: Performance* certificate is a program designed to provide students with the knowledge and skills necessary for studio recording and live performance in the commercial music industry. Courses allow students to become proficient on an instrument or voice, gain experience as an ensemble member, study the fundamentals of music including sight-reading and piano skills, become familiar with music technology and record in a state-of-the-art recording studio. Classes are taught utilizing industry-standard software and equipment in state-of-the-art facilities. The program prepares students for a wide variety of careers as instrumentalists and vocalists in studio or live performance settings.

Certificate Program

Program Learning Outcomes

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

- Understand and employ fundamentals of music and musicianship such as melody, harmony, chord structure, rhythm, key signatures, phrasing, sight-singing and scalar patterns.
- Identify and discuss the origins of commercial music and explain how it relates to society today.
- Create and manipulate vocal or instrumental technique in a studio and live performance setting such as fingerings, dynamics, diction, breathing, rhythm, phrasing and vowel or finger placement.
- Memorize and recall standard commercial music literature in a live ensemble performance.

Required Courses (32 units)		Units
MUC-1	Performance Techniques for Studio Recording (take 3 times/2 units)	6
MUC-7	Introduction To Music Technology	3
MUS-3	Fundamentals of Music	4
MUS-32	Class Piano	1
MUS-38	Beginning Applied Music Training (take 3 times/2 units)	6
MUS-65	Basic Musicianship	2
Electives (choose from the lists below)		10

Select 6 units from the following:

MUC-3	Introduction to Pro Tools: MIDI and Audio Production	3
MUS-19	Music Appreciation	3
MUS-23	History of Rock and Roll	3
MUS-93	The Business of Music	3

Select 4 units from the following:

MUC-10	Norco Choir	2
MUC-11	Studio Arts Ensemble	2

Associate in Arts Degree

The Associate in Arts Degree in Commercial Music: Performance will be awarded upon completion of the degree requirements, including general education and other graduation requirements as described in the college catalog.

ARCHITECTURAL GRAPHICS**NCE787**

The Architectural Graphics certificate prepares students with technical communication skills, and the knowledge and craft of two dimensional drafting solutions for architecturally related industry applications. Students learn to present graphic solutions, provide design refinements, modifications, and delineations of working technical drawings using current Computer-Aided Drafting CAD methods and techniques with an understanding of industry standards. Certificate completers are able to secure drafting technician positions in areas related to architecture, environmental design, and to assist in the development of architectural construction documents for light frame structures, under the supervision of a professional.

Certificate Program**Program Learning Outcomes**

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

- Complete a set of residential working drawings, which may include first floor drawings, second floor drawings, foundation drawings, elevations, cross-sections, framing, electrical drawings, and structural detail.
- Demonstrate an ability to apply and integrate computer technology into the design process to achieve a desired result.

<u>Required Courses (9 units)</u>		<u>Units</u>
ARE-24	Architectural Drafting	3
ENE-21	Drafting	3
ENE-30	Computer-Aided Drafting	3