IND TEK 361*	Inert Gas Arc Welding I	3
IND TEK 362	Inert Gas Arc Welding II	3
IND TEK 461	Advanced Arc Welding I.	3
IND TEK 462	Advanced Welding II.	3
Select one course from the following:		3
EGD TEK 101	Engineering Graphics	3
IND TEK 105	Industrial Print Reading with GD&T.	3
IND TEK 130	Technology of Metal Machining Processes I	3
IND TEK 140	Fundamentals of CNC Technology.	3
IND TEK 346	CAM Programming Using SURFCAM	3
MAJOR - TOTAL UNITS		**24**

GENERAL EDUCATION - REQUIRED COURSES

Students must complete one of the following General Education Plans:

LACCD GE	LACCD General Education Plan	21 units
CSU GE	CSU GE Breadth Certification Plan	39 units
IGETC	Intersegmental GE Transfer Curriculum	34-37 units

See Catalog course description for prerequisites and/or corequisites.

GAS AND ELECTRIC WELDING

Certificate of Achievement

(STATE CODE 36911)

Faculty Advisor: Professor Elizabeth Cheung

PROGRAM INFORMATION

The Gas and Electric Welding Certificate of Achievement is intended for students who are looking to develop their trade skills in Gas and Electric Welding pursuant to the standards established by the American Welding Society. Students learn hands-on, technical, and calculation skills that can be applied in a multitude of industry occupations such as automotive, construction, transportation, aerospace, and the medical field. Upon successful completion of the program, students are prepared to enter the following career opportunities: welders, welding inspector, welding technician/fitter, pipe fitter/welder, and metal fabricators.

GAINFUL EMPLOYMENT

To find information about the careers for which this certificate prepares you, the costs associated with the program, median debt accumulated by students completing the program, and time to completion, please visit the Gainful Employment Disclosure website at: ***http://www.piercecollege.edu/departments/cate.asp***

PROGRAM LEARNING OUTCOMES

Upon completion of this program, students will:

- Perform trade calculations related to welding construction and maintenance work.
- Work independently and interdependently to safely accomplish shared professional outcomes.
- Students will be knowledgeable, and demonstrate welding using Shielded Metal Arc Welding (SMAW) techniques to weld in flat, horizontal, vertical, and overhead position using E7018 electrode.
- Students will have the necessary skill for welding all positions related to plate.
- Students will have the knowledge, aptitude, and skills necessary for employment in welding.
- Students will be able to set-up and operate Shielded Metal Arc Welding equipment, and demonstrate welding techniques.
- Use hand a power tools to perform welding construction and maintenance work, such as grinders, sanders, drill press, and band saw.

CERTIFICATE - REQUIRED COURSES

SUBJECT & NO.	COURSE	UNITS
IND TEK 161	Oxy-Acetylene Welding I	3
IND TEK 261*	Arc Welding I.	3
IND TEK 262*	Arc Welding II.	3
IND TEK 361*	Inert Gas Arc Welding I	3
IND TEK 362	Inert Gas Arc Welding II	3
IND TEK 461	Advanced Arc Welding I.	3
IND TEK 462	Advanced Welding II.	3
Select one course from the following:		3
EGD TEK 101	Engineering Graphics	3
IND TEK 105	Industrial Print Reading with GD&T.	3
IND TEK 130	Technology of Metal Machining Processes I	3
IND TEK 140	Fundamentals of CNC Technology.	3
IND TEK 346	CAM Programming Using SURFCAM	3
CERTIFICATE - TOTAL UNITS		**24**

See Catalog course description for prerequisites and/or corequisites.

NUMERICAL CONTROL PROGRAMMING

Associate of Science Degree

(STATE CODE 02831)

Faculty Advisor: Professor Elizabeth Cheung

PROGRAM INFORMATION

Numerical Control is a system (sometimes referred to as CAM - Computer-Aided Manufacturing) using specially prepared instructions, developed by the N/C Programmer, to control the operation of various manufacturing equipment such as machine tools, inspection machines, woodworking machines, laser machines, and robots. The following associate degree is offered at the suggestion of the Industry Advisory Committee for Numerical Control.

Courses may be taken in any sequence, but recommended preparation should be met.

Completion of the following three courses, IND TEK 105, 130 and 140, may provide entry level employment opportunities.

TRANSFER STUDENTS

Completing the Associate Degree does not necessarily meet the university-admission requirements for transfer. An Associate Degree is not a requirement for transfer to either the CSU or UC campuses. Private and out-of-state colleges and universities have unique transfer requirements. However, if you would like to transfer to a university and earn an associate degree, early educational planning can make this goal achievable. You should meet with a counselor early in your studies to develop an Educational Plan that fulfills both transfer requirements and associate degree requirements.

See page 265 of this catalog for more information on transfer requirements and resources.

PROGRAM LEARNING OUTCOMES

Upon completion of this program, students will:

- Knowledge to prepare NC programs that control the operation of various manufacturing equipment.
- Safely and effectively use a variety of machine tools. Work with inspection machines, woodworking machines, laser machines and robots.
- Ability to work independently or as a team member.

MAJOR - REQUIRED COURSES

SUBJECT & NO.	COURSE	UNITS
IND TEK 105	Industrial Print Reading with GD&T	3
IND TEK 130	Technology of Metal Machining Processes I	3
IND TEK 140	Fundamentals of CNC Technology	3
IND TEK 230*	Technology of Metal Machining Processes II	3
IND TEK 244	CNC Programming and Machine Operation - Lathe	3
IND TEK 248*	CNC Programming and Machine Operation - Mill	3
IND TEK 330*	Technology of Metal Machining Processes III	3
IND TEK 332*	Projects Laboratory in Metal Machining Processes I	3
IND TEK 346	CAM Programming Using SURFCAM	3
IND TEK 444*	Projects Laboratory--CNC Lathe Programming	3
IND TEK 448*	Projects Laboratory--CNC Mill Programming	3
MAJOR - TOTAL UNITS		**33**

GENERAL EDUCATION - REQUIRED COURSES

Students must complete one of the following General Education Plans:

LACCD GE	LACCD General Education Plan	21 units
CSU GE	CSU GE Breadth Certification Plan	39 units
IGETC	Intersegmental GE Transfer Curriculum	34-37 units

See Catalog course description for prerequisites and/or corequisites.

NUMERICAL CONTROL PROGRAMMING

Certificate of Achievement

(STATE CODE 21814)

Faculty Advisor: Professor Elizabeth Cheung

PROGRAM INFORMATION

The Certificate Program is designed for students wishing to complete only the technical requirements of the Numerical Control Programming Associate Degree program, secure employment and possibly complete the Numerical Control Programming Associate Degree while employed and attending Los Angeles Pierce College part time. It is also designed to enable mechanical drafting, tool design, machine shop, and other majors to secure certification in Numerical Programming as a second area of expertise. The notes applying to the Associate Degree apply also to the certificate program. Courses may be taken in any sequence as long as the prerequisites and recommended preparation coursework are met. However, the first five courses listed provide a possible entry-level employment package.

GAINFUL EMPLOYMENT

To find information about the careers for which this certificate prepares you, the costs associated with the program, median debt accumulated by students completing the program, and time to completion, please visit the Gainful Employment Disclosure website at: ***http://www.piercecollege.edu/departments/cate.asp***

PROGRAM LEARNING OUTCOMES

Upon completion of this program, students will:

- Knowledge to prepare NC programs that control the operation of various manufacturing equipment.
- Safely and effectively use a variety of machine tools. Work with inspection machines, woodworking machines, laser machines and robots.

CERTIFICATE - REQUIRED COURSES

SUBJECT & NO.	COURSE	UNITS
IND TEK 105	Industrial Print Reading with GD&T	3
IND TEK 130	Technology of Metal Machining Processes I	3
IND TEK 140	Fundamentals of CNC Technology	3
IND TEK 230*	Technology of Metal Machining Processes II	3
IND TEK 244	CNC Programming and Machine Operation - Lathe	3
IND TEK 248*	CNC Programming and Machine Operation - Mill	3
IND TEK 330*	Technology of Metal Machining Processes III	3
IND TEK 332*	Projects Laboratory in Metal Machining Processes I	3
IND TEK 346	CAM Programming Using SURFCAM	3
IND TEK 444*	Projects Laboratory--CNC Lathe Programming	3
IND TEK 448*	Projects Laboratory--CNC Mill Programming	3
MATH 125*	Intermediate Algebra or higher	3-5
CERTIFICATE - TOTAL UNITS		**36-38**

See Catalog course description for prerequisites and/or corequisites.

Mathematics

Associate of Arts Degree

(STATE CODE 22923)

PROGRAM INFORMATION

A student may earn a Mathematics Associate Degree in Arts by satisfactory completion of at least 18 units in mathematics courses listed below, in addition to the Associate Degree Common Requirements. At least 6 of those units must be from Math 263, Math 270, or Math 275.

TRANSFER STUDENTS

Completing the Associate Degree does not necessarily meet the university-admission requirements for transfer. An Associate Degree is not a requirement for transfer to either the CSU or UC campuses. Private and out-of-state colleges and universities have unique transfer requirements. However, if you would like to transfer to a university and earn an associate degree, early educational planning can make this goal achievable. You should meet with a counselor early in your studies to develop an Educational Plan that fulfills both transfer requirements and associate degree requirements.

See page 265 of this catalog for more information on transfer requirements and resources.

PROGRAM LEARNING OUTCOMES

Upon completion of this program, students will:

- Model and solve applied problems using derivatives, integrals, systems of equations, and/or differential equations as appropriate.
- Interpret values of functions and solutions of equations in an applied context.