

## San Joaquin Delta College Catalog 98 - 99

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## **CAREER GUIDE**

### **Certificate Programs**

This section includes all certificates offered currently by San Joaquin Delta College. The certificates are designed to provide applied training in specific occupational areas that will prepare students with employable skills in the prescribed certificate area. The certificates are recognized favorably by business and industry, and they are often required for job classification advancement.

#### **Certificate Requirements**

1. Each course must be completed with at least a minimum grade of “C.”
2. Equivalent courses from other accredited colleges verified by official transcript may be accepted upon approval of the division chairperson. The last 12 units of the certificate must be completed, in residence, at San Joaquin Delta College.
3. For those courses that require a skill-level prerequisite, students must have met the prerequisite skills successfully before enrolling in the course.

#### **Application Procedure for Certificates**

1. During the completing semester of the certificate program, file the Application for Certificate form with the division office responsible for the respective certificate program. These forms are available in the division office.
2. Applications must be filed by the deadline date as announced in College's Academic Calendar. The Academic Calendar is published in the COLLEGE CATALOG.

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## AGRICULTURE BUSINESS CERTIFICATE

**Total Units Required 60 - 62**

**Required Courses**

AGBUS 10	Management Records	3
AGBUS 12	Agriculture Economics	3
AGBUS 15	Agriculture Business Computer Applications	3
AGBUS 46	Agricultural Marketing	3
AH SC 10	Principles of Animal Science	3
<b>AND</b>		
AH SC 10L	Principles of Animal Science Laboratory	1
PLANT 10	Principles of Plant Science	3
<b>AND</b>		
PLANT 10L	Principles of Plant Science Laboratory	1
PLANT 14	Soil Science	4
ENG 1A	Written Communications	3
SPCH 1A	Fundamentals of Speech	3
C S 11	Computer Science Fundamentals	3
•MATH	See Group 1	3 - 4
ECON 1A	Principles of Economics (Macro)	3
••HIST	See Group 2	3
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**•Group 1 (Electives)**

(one course from the following)

AG BUS 13	Agriculture Mathematics	3
MATH 80	Elementary Algebra	4

**••Group 2 (History or Political Science)**

(one course from the following)

HIST 17A	History of the U. S.	3
HIST 17B	History of the U. S.	3
POLSCI 1	American Government	3

**•••Group 3 (Humanities)**

(one course from Group III, Humanities, general education requirement for the Associate degree)

**••••Group 4 (Electives)**

(minimum of 19 units from the following)

BIOL 1	Biology	4
CHEM 3A	Introduction to General Chemistry	4
<b>OR</b>		
CHEM 1A	General Chemistry	5
MATH 12	Introduction to Probability and Statistics	3
MATH 30	College Algebra	4
BUS 1A	Principles of Accounting	4

## AGRICULTURE BUSINESS ANIMAL SCIENCE CERTIFICATE

**Total Units Required 36**

**Required Courses**

AGBUS 10	Management Records	3
AGBUS 12	Agriculture Economics	3
AGBUS 13	Agriculture and Natural Resources	
	Mathematics	3
AGBUS 15	Agriculture Business Computer Applications	3
AGBUS 46	Agriculture Marketing	3
AGBUS 96V	Work Experience	1
AH SC 10	Principles of Animal Science	3
<b>AND</b>		
AH SC 10L	Principles of Animal Science Laboratory	1
AH SC 11A	Livestock Evaluation	2
AH SC 19	Feeds and Feeding	4
AH SC 21	Livestock Production	3
AH SC 25A	Livestock Husbandry Practicum	2
AH SC 25B	Livestock Husbandry Practicum	2
AH SC 34	Animal Health and Sanitation	3

## AGRICULTURE BUSINESS PLANT SCIENCE CERTIFICATE

**Total Units Required 38**

**Required Courses**

AGBUS 10	Management Records	3
AGBUS 12	Agriculture Economics	3
AGBUS 13	Agriculture and Natural Resources	
	Mathematics	3
AGBUS 15	Agriculture Business Computer Applications	3
AGBUS 46	Agriculture Marketing	3
AGBUS 96V	Work Experience	1
AGEGR 33	Equipment Operation & Maintenance	2
PLANT 10	Principles of Plant Science	3
<b>AND</b>		
PLANT 10L	Principles of Plant Science Laboratory	1
PLANT 12	Economic Entomology	3
PLANT 13	Weeds & Crop Pests	3
PLANT 14	Soil Science	4
PLANT 36A	Deciduous Fruit & Grape Production	3
OH 22	Plant Propagation	3

## AGRICULTURE MECHANICS CERTIFICATE

**Total Units Required 34-37**

**Required Courses**

AGEGR 20A	Agriculture and Natural Resource Shop Skills	2
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**OR**

INDUS 76	Tools and Measurements	3
AGEGR 21	Agriculture Welding	3

**OR**

MECH 10	Metallurgical Technology and Welding	4
AGBUS 13	Agriculture and Natural Resources Mathematics	3

**OR**

INDUS 94	Industrial Mathematics	3
AGEGR 30A	Compact Engines series	5
AGEGR 30B	Compact Engines series	5
AGEGR 30C	Compact Engines series	5
AGEGR 33	Equipment Maintenance and Operations	2
AGEGR 96V	Work Experience: Agricultural Engineering	2
INDUS 35	Mobile Hydraulics	4
•ELECTIVE	See Group 1	3 - 4

**•Group 1 (Electives)**

(one course from the following)

AUTO 63	Fuel and Electrical Systems	3
DIESEL 46	Diesel Engine Fuel and Tune-up	3
MECH 15	Machine Tool Process	4

## NATURAL RESOURCES MANAGEMENT CERTIFICATE

**Total Units Required 38**

**Required Courses**

N R 1	Introduction to Forestry	3
N R 2	Conservation of Natural Resources	3
N R 5	Park Systems and Management	3
N R 6	Introduction to Wild Life Management	4
N R 10	Introduction to Water Resources	3
PLANT 10	Introduction to Plant Science	3
PLANT 10L	Principles in Plant Science Laboratory	1
PLANT 12	Economic Entomology	3
PLANT 14	Soil Science	4
AGBUS 13	Agriculture and Natural Resources Mathematics	3
AGEGR 33	Equipment Operation and Maintenance	2
AGBUS 15	Agriculture Business Computer Applications	3
O H 22	Plant Propagation	3

## ORNAMENTAL HORTICULTURE LANDSCAPE CERTIFICATE

**Total Units Required 47**

**Recommended Sequence:**

First Semester

O H 10	Introduction to Ornamental Horticulture	2
O H 21A	Identification of Fall Plants	3
O H 37	Landscape Construction	3
PLANT 10	Principles of Plant Science	3
PLANT 10L	Principles of Plant Science Laboratory	1

Second Semester

O H 21B	Identification of Spring Plants	3
O H 71	Introduction to Plant Pests and Diseases	2
O H 62	Landscape Irrigation and Drainage	3
PLANT 14	Soil Science	4

Third Semester

AGBUS 13	Agriculture and Natural Resource Mathematics	3
O H 35	Landscape Maintenance	3
OCCUP 74	Occupational Practice Laboratory	2

**OR**

O H 69V	Internship: Ornamental Horticulture	2
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**OR**

O H 96V	Work Experience: Ornamental Horticulture	2
PLANT 12	Economic Entomology	3

Fourth Semester

AGBUS 15	Agribusiness Computer Applications	3
O H 22	Plant Propagation	3
O H 26	Turf Practices	3
O H 40	Principles of Landscape Design	3

## ORNAMENTAL HORTICULTURE NURSERY CERTIFICATE

**Total Units Required 47**

**Recommended Sequence:**

First Semester

O H 10	Introduction to Ornamental Horticulture	2
O H 21A	Identification of Fall Plants	3
O H 22	Plant Propagation	3
PLANT 10	Principles of Plant Science	3
PLANT 10L	Principles of Plant Science Laboratory	1

Second Semester

O H 21B	Identification of Spring Plants	3
O H 30	Introduction to Floriculture	3
O H 62	Landscape Irrigation and Drainage	3
PLANT 14	Soil Science	4

Third Semester

AGBUS 13	Agriculture and Natural Resource Mathematics	3
O H 29	House Plants and Interior Landscaping	3
OCCUP 74	Occupational Practice Laboratory	2
OR		
O H 69V	Internship: Ornamental Horticulture	2
OR		
O H 96V	Work Experience: Ornamental Horticulture	2
PLANT 12	Economic Entomology	3

Fourth Semester

AGBUS 15	Agribusiness Computer Applications	3
O H 71	Introduction to Plant Pests and Diseases	2
O H 35	Landscape Maintenance	3
O H 40	Principles of Landscape Design	3

## EMERGENCY MEDICAL TECHNICIAN CERTIFICATE

**EMT - 1**

**Total Units Required 4**

**Prerequisites to the Program**

- 1 Advanced First Aid or equivalent.
- 2 Current CPR certificate or health care provider level.

**Required Courses**

H S 77B	Emergency Medical Technician I	4
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**Recertification Prerequisites**

- 1 Current CPR certificate.
- 2 EMT - 1 certificate at health care provider level may not have expired more than four years prior to enrolling in a refresher course.

**Refresher Courses**

H S 81 A	EMT Refresher	1
H S 81 B	EMT Refresher	1
H S 81 C	EMT Refresher	1
H S 81 D	EMT Refresher	1
H S 81 E	EMT Refresher	1

## MOBILE INTENSIVE CARE NURSING (MICN) CERTIFICATE

**Total Units Required 5**

**Prerequisites:**

- 1 Must be a registered nurse (R.N.) with a minimum of one year of experience.

**OR**

- 2 Currently employed in an emergency room or a critical care area.
- 3 Current CPR or ACLS and successful completion of H S 34A, Basic Electrocardiograph Reading, or the equivalent.

**Required Course**

NURS 12	Mobile Intensive Care Nursing	5
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## NURSE ASSISTANT PROGRAM CERTIFICATE

**Total Units Required 5**

**Required Course**

H S 70	Nurse Assistant Training	5
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## PSYCHIATRIC TECHNICIAN CERTIFICATE

**Total Units Required 41**

**Prerequisites**

BIO 11	Human Biology	4
<b>OR</b>		
ANAT 1	Human Anatomy	4
<b>OR</b>		
ANAT 2	Anatomy & Physiology	6
H S 36	Medical Terminology & Speech	3
FCS 19/H S 19	Human Development	3
PSYCH 1	Introduction to Psychology	3

**Recommended Sequence:**

First Semester (Spring)

PSYCH TECH 80	Foundations of Nursing	8.5
PSYCH TECH 81	Introduction to Medical-Surgical Nursing	8.5

Second Semester (Summer)

PSYCH TECH 82	Psychiatric Technician Nursing	8
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Third Semester (Fall)

PSYCH TECH 83	Advanced Psychiatric Technician Nursing	4.5
PSYCH TECH 84	Developmental Disabilities Nursing	6.0
PSYCH TECH 85	Advanced Developmental Disabilities Nursing	5.5

## PUBLIC HEALTH TECHNICIAN CERTIFICATE

**Total Units Required 34 - 36**

**Recommended Sequence:**

First Semester

H ED 1	Health Education	3
H ED 28	Community Health	2
FCS 2	Life Management	3
ENG 1A	Written Communications	3
<b>OR</b>		
ENG 79	Preparatory English	5

Second Semester

H S 19	Human Development	3
H S 30	New Trends in Health Care	1
H S 36	Medical Terminology	3
BIM 7A	Beginning Word Processing: Concepts & Applications	4

Third Semester

FCS 6	Nutrition	3
PSYCH 53	Drugs and Society	3
SOCIO 24	Social Welfare	3
SOCIO 1A	Introduction to Sociology	3



## RADIOLOGIC TECHNOLOGY CERTIFICATE

**Total Units Required 71.5**

### Prerequisites to the Program:

- 1 High school diploma with a 2.5 grade-point average for high school and college (if applicable), GED or High School Proficiency Certificate.
- 2 One year of high school algebra with at least a 2.0 grade-point average or an equivalent college course.
- 3 Qualified for English 1A (college assessment testing required unless an associate degree or higher has been earned).
- 4 Completion of Health Science 36, Medical Terminology and Speech.
- 5 Completion of Anatomy 1, Human Anatomy.

### Required Courses

#### Summer

RAD 10	Introduction to Radiography	3.5
RAD 10A	Beginning Clinical Laboratory	2

#### Fall

RAD 10B	Intermediate Clinical Laboratory	5
RAD 11	Radiographic Positioning and Terminology	6
RAD 12	Radiographic Anatomy	2
RAD 13	Principles of Radiographic Technique	4
RAD 14	Darkroom Chemistry and Processing	1

#### Spring

RAD 20	Advanced Radiographic Positioning and Terminology	4
RAD 20A	Advanced Clinical Laboratory	6
RAD 21	Advanced Radiographic Anatomy	2
RAD 22	Fundamentals of X-Ray and Radium Physics	4
RAD 23	Positioning and Technical Laboratory	0.5

#### Summer

RAD 30	Intermediate Positioning and Technical Laboratory	0.5
RAD 30A	Senior Clinical Laboratory	4

#### Fall

RAD 30B	Advanced Senior Clinical Laboratory	8
RAD 31	Advanced Positioning and Technical Laboratory	1
RAD 32	Sectional Anatomy	2

#### Spring

RAD 40	Senior Review and Advanced Radiation Protection	6
RAD 40A	Radiologic Laboratory	7
RAD 41	Radiographic Pathology and Film Critique	3

**NOTE: The following electives are recommended, but they are not required.**

PHSCI 1	Matter and Energy	3
PHYSC 2A	General Physics	4
PHYSC 2B	General Physics	4
BIOL 11	Human Biology	4
CHEM 3A	Introduction to Chemistry	4
POLSC 1	American Government and Institutions	3
<b>OR</b>		
HIST 17A	U. S. History	3
<b>OR</b>		
HIST 17B	U. S. History	3
PSYCH 1	Introduction to Psychology	3
BUS 30	Supervision and Human Relations	3
ENG 1A	Written Communications	3
H ED 31	First Aid	3
H ED 1	Health Education	3
PHYSC 10	Introduction to Physics	4

## RESIDENT CARE HOME ADMINISTRATION CERTIFICATE

**Total Units Required 30 - 32.5**

**Recommended Sequence:**

First Semester

H S 72A	Care Provider Training: Mental Disabilities	1
H S 72B	Care Provider Training: Psychotropic Medication	1
H S 72C	Care Provider Training: Behavior Management	1
H S 72D	Care Provider Training: Normalization	1
H S 72E	Care Provider Training: Pre-Independent Living	1
H S 72F	Care Provider Training: Community Resources	1
ENG 1A	Written Communications	3
<b>OR</b>		
ENG 79	Preparatory English	5

Second Semester

H S 72G	Care Provider Training: Recognizing other Problems	1
H S 72H	Care Provider Training: Client Record Keeping	1
H S 72I	Care Provider Training: Nutrition	1
FCS 2	Life Management	3
H ED 30	Community First Aid & Safety	2
P E 39F	Adapted Conditioning	1 - 1.5

Third Semester

H S 19	Human Development	3
H S 36	Medical Terminology	3
FCS 5	Basic Nutrition	3
FCS 24	Adult Development and Aging	3

## VOCATIONAL NURSING CERTIFICATE

**Total Units Required 42**

**Prerequisites:**

BIO 11	Human Biology	4
<b>OR</b>		
ANAT 1	Human Anatomy	4
<b>OR</b>		
ANAT 2	Anatomy and Physiology	6
H S 36	Medical Terminology and Speech	3
FCS 19/H S 19	Human Development	3
PSYCH 1	Introduction to Psychology	3

**Recommended Sequence:**

First Semester (Fall)

VOC NUR 1	Foundations of Nursing	8.5
VOC NUR 2	Introduction to Medical Surgical Nursing	8.5

Second Semester (Spring)

VOC NUR 3	Obstetrical Nursing	3.5
VOC NUR 4	Pediatric Nursing	3.5

Third Semester (Summer Intersession)

VOC NUR 5	Intermediate Medical: Surgical Nursing	9
VOC NUR 6	Advanced Medical: Surgical Nursing	9

## AUTO BODY REPAIR CERTIFICATE

**Total Units Required 43**

**Required Courses**

AUTO 84A	Auto Body Repair	5
AUTO 84B	Auto Body Repair	5
AUTO 84C	Auto Body Repair	5
AUTO 84D	Auto Body Repair	5
AUTO 81A	Auto Body Repair Laboratory	1
AUTO 81B	Auto Body Repair Laboratory	1
AUTO 81C	Auto Body Repair Laboratory	1
AUTO 81D	Auto Body Repair Laboratory	1
INDUS 94	Industrial Mathematics (or equivalent)	3
INDUS 97	Industrial Relations	3
INDUS 20	Industrial Safety & Health	3
INDUS 76	Tools & Measurement	3
•ELECTIVES	See Group 1	7

**•Group 1 (Electives)**

(minimum of 7 units from the following)

AUTO 64	Basic Engines	3
MECH 10	Welding	4
MECH 60	Metal Layout & Forming	5

## AUTO ELECTRICS TECHNOLOGY CERTIFICATE

**Total Units Required 40**

**Required Courses**

AUTO 54	Starting & Charging Systems	5
AUTO 55	Tune-up & Engine Performance	5
AUTO 56	Fuel Management & Computer Control	7
AUTO 57	Air Conditioning, Heating & Electrical	5
INDUS 76	Tools & Measurement	3
INDUS 45	Industrial Technology	5
INDUS 97	Industrial Relations	3
INDUS 94	Industrial Mathematics	3
•ELECTIVES	See Group 1	7

**•Group 1 (Electives)**

(minimum of 7 units from the following)

AUTO 50	Automatic Transmission & Transaxles	5
AUTO 51	Manual Drive Train & Axles	5
AUTO 52	Engine Rebuilding	7
AUTO 53	Brakes, Suspension & Steering	7
DIESL 44	Diesel Engine Principles	3

## AUTOMOTIVE MASTER TECHNICIAN CERTIFICATE

**Total Units Required 59 - 60**

**Required Courses**

AUTO 52	Engine Rebuilding	7
AUTO 54	Starting & Charging Systems	5
INDUS 94	Industrial Mathematics	3
AUTO 51	Manual Drive Train & Axles	5
AUTO 55	Tune-up & Engine Performance	7
INDUS 45	Industrial Technology	5

**OR**

INDUS 35	Mobile Hydraulics	4
AUTO 50	Automatic Transmission & Transaxles	5
AUTO 56	Fuel Management & Computer Control	7
MECH 10	Metallurgy and Welding	4
AUTO 53	Brakes, Suspension & Steering	7
AUTO 57	Air Conditioning, Heating & Electrical	5

## AUTO MECHANICS TECHNOLOGY CERTIFICATE

**Total Units Required 40 - 42**

**Required Courses**

AUTO 50	Automatic Transmissions & Transaxles	5
AUTO 51	Manual Drive Train and Axles	5
AUTO 52	Engine Rebuilding	7
AUTO 53	Brakes, Suspension & Steering	7
INDUS 35	Mobile Hydraulics	4
INDUS 94	Industrial Mathematics	3
MECH 10	Metallurgy and Welding	4
•ELECTIVES	See Group 1	5 - 7

**•Group 1 (Electives)**

(one course from the following)

AUTO 54	Starting & Charging Systems	5
AUTO 55	Tune-up & Engine Performance	5
AUTO 56	Fuel Management & Computer Control	7
AUTO 57	Air Conditioning, Heating & Electrical	5

## DIESEL CERTIFICATE

**Total Units Required 40**

**Recommended Sequence:**

First Semester

DIESL 41	Heavy Duty Brakes	3
DIESL 44	Diesel Engine Principles	3
DIESL 45	Diesel Engine Repair	4.5
MECH 10	Metallurgical Technology and Welding	4

Second Semester

DIESL 42	Heavy Duty Power Trains	3.5
DIESL 43	Heavy Duty Truck Components	3
DIESL 46	Diesel Engine Fuel and Tune-up	3
DIESL 47	Diesel Air Conditioning	2
DIESL 49	Computer Diagnosis and Troubleshooting	2

Third Semester

AUTO 54	Starting and Charging Systems	5
INDUS 35	Mobile Hydraulics	4
INDUS 94	Industrial Mathematics	3

## DIESEL-AUTOMOTIVE CERTIFICATE

**Total Units Required 52**

**Recommended Sequence:**

First Semester

DIESL 41	Heavy Duty Brakes	3
DIESL 44	Diesel Engine Principles	3
DIESL 45	Diesel Engine Repair	4.5
MECH 10	Metallurgical Technology and Welding	4

Second Semester

DIESL 42	Heavy Duty Power Trains	3.5
DIESL 43	Heavy Duty Truck Components	3
DIESL 46	Diesel Engine Fuel and Tune-up	3
DIESL 47	Diesel Air Conditioning	2
DIESL 49	Computer Diagnosis and Troubleshooting	2

Third Semester

AUTO 54	Starting and Charging Systems	5
INDUS 35	Mobile Hydraulics	4
INDUS 94	Industrial Mathematics	3

Fourth Semester

(Minimum of 12 units from the following)

AUTO 50	Automatic Transmissions and Transaxles	5
AUTO 53	Brakes, Suspension and Steering	7
AUTO 55	Tune-up and Engine Performance	7
AUTO 57	Air Conditioning, Heating and Electrical	5

## SMALL ENGINE REPAIR TECHNOLOGY CERTIFICATE

**Total Units Required 39 -41**

**Required Courses**

SM ENG	See Group 1	20
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**OR**

AGEGR	See Group 2	20
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INDUS 76	Tools and Measurement	3
MECH 10	Metallurgy and Welding	4
INDUS 97	Industrial Relations	3
INDUS 20	Industrial Safety & Health	3
INDUS 94	Industrial Mathematics	3

**OR**

INDUS 45	Industrial Technology	5
AUTO 62	Brake, Suspension, and Power Train Systems	3

**OR**

AUTO 63	Fuel and Electrical Systems	3
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**Group 1 (Small Engine)**

SM ENG 30A	Small Engine Mechanics	5
SM ENG 30B	Small Engine Mechanics	5
SM ENG 30C	Small Engine Mechanics	5
SM ENG 30D	Small Engine Mechanics	5

**Group 2 (Agriculture Engineering)**

AGEGR 30A	Introduction to Compact Engines	5
AGEGR 30B	Beginning Compact Engines	5
AGEGR 30C	Intermediate Compact Engines	5
AGEGR 30D	Advanced Compact Engines	5

## ELECTRON MICROSCOPY CERTIFICATE BIOLOGICAL

**Total Units Required 53-57**

### Recommended Sequence:

#### First Semester (Fall)

C S 18B	Microcomputers and Small Business: Apple Macintosh	3
E M 11	Photography for Laboratory Technicians	2
E M 21	Techniques of Electron Microscopy	3
•MATH		
REQUIREMENT	See Group 1	4
BIOL 1	Core Biology	4

#### Second Semester (Spring)

E M 22	Ultramicrotomy for Electron Microscopy	4.5
CHEM 3A	Introduction to Chemistry	4
PHYS 10	Introduction to Physics	4
•MATH		
REQUIREMENT	See Group I	4 - 5

#### Third Semester (Fall)

E M 28	Cell Ultrastructure	2
E M 37	Biological Electron Microscopy Laboratory	3.5
E M 38	Scanning Electron Microscopy	3
E M 53	Electron Microscopy Equipment Maintenance	3
E M 58	Digital Imaging for Microscopy	2
•MATH		
REQUIREMENT	See Group 1	0 - 3

#### Fourth Semester (Spring)

E M 30	Current Microscopies	3
E M 39	Advanced Biological SEM	2
E M 59	Advanced Projects in Electron Microscopy	2

### •Group 1 (Mathematics Requirement)

Option 1: MATH 80, MATH 82, and MATH 31

Option 2: MATH 80 and MATH 87

### Suggested Electives

ANAT 2	Anatomy and Physiology	6
C S 17	Computer Logic	3
E M 15C	TEM Alignment and Use	1
E M 41	Analytical Scanning Electron Microscopy	3
E M 50H	Special Study: Electron Microscopy	1 - 2
MATH 12	Introduction to Probability and Statistics	3
OCCUP 74	Occupational Practice Laboratory	1 - 3
ZOOL 1	General Zoology	5

NOTE: All electron microscopy courses in the certificate program must have been completed within the last 4 years or have permission of the instructor.

## ELECTRON MICROSCOPY CERTIFICATE CRYSTALLINE

**Total Units Required 49.5-53.5**

### Recommended Sequence:

#### First Semester (Fall)

C S 18B	Microcomputers and Small Business: Apple Macintosh	3
E M 11	Photography for Laboratory Technicians	2
E M 21	Techniques of Electron Microscopy	3
•MATH		
REQUIREMENT	See Group 1	4
PHYS 10	Introduction to Physics	4

#### Second Semester (Spring)

ENGR 60	Engineering Materials	4
CHEM 3A	Introduction to Chemistry	4
E M 34	Introduction to Physical Electron Microscopy	2
•MATH		
REQUIREMENT	See Group I	4 - 5

#### Third Semester (Fall)

E M 35	Physical Electron Microscopy Laboratory	3.5
E M 38	Scanning Electron Microscopy	3
E M 53	Electron Microscopy Equipment Maintenance	3
E M 58	Digital Imaging for Microscopy	2
•MATH		
REQUIREMENT	See Group 1	0 - 3

#### Fourth Semester (Spring)

E M 30	Current Microscopies	3
E M 41	Analytical Scanning Electron Microscopy	3
E M 59	Advanced Projects in Electron Microscopy	2

### •Group 1 (Mathematics Requirement)

Option 1: MATH 80, MATH 82, and MATH 31

Option 2: MATH 80 and MATH 87

### Suggested Electives

C S 17	Computer Logic	3
ELECT 11	AC and DC Network Analysis	5
E M 15C	TEM Alignment and Use	1
E M 50H	Special Study: Electron Microscopy	1 - 2
MATH 12	Introduction to Probability and Statistics	3
OCCUP 74	Occupational Practice Laboratory	1 - 3
ENGR 3	Engineering Drafting Skills	3

NOTE: All electron microscopy courses in the certificate program must have been completed within the last 4 years or have permission of the instructor.

## ACCOUNTING CERTIFICATE

**Total Units Required 31**

**Required Courses**

BUS 1A	Principles of Accounting	4
BUS 1B	Principles of Accounting	4
BUS 3	Financial Accounting	4
BUS 4	Managerial Accounting	4
BUS 20	Introduction to Business	3
•ELECTIVES	See Group 1	12

**•Group 1 (Electives)**

(minimum of 12 units from the following)

BIM 1A	Beginning Keyboarding	1.5
BIM 31	Electronic Calculation	3

**OR**

BIM 32A	Beginning Office Calculation	1
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**AND**

BIM 32B	Intermediate Office Calculation	1
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**AND**

BIM 32C	Advanced Office Calculation	1
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BIM 33	Using Business Calculation	2
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BUS 11	Federal Income Tax Procedures	3
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BUS 13	Accounting on the Microcomputer	2
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BUS/C S 14	Microcomputers & Small Business Systems	3
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BUS 15	Lotus 1-2-3 for Accounting	2
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BUS 16	Computer Assisted Writing	0.5
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BUS 18A	Foundations of Business Law	3
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BUS 26	Economics of Business	3
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BUS 63	Analysis of Financial Statements	3
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BUS 82B	Business Mathematics 2	2
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**AND**

BUS 82C	Business Mathematics 3	2
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C S 11	Computer Science Fundamentals	3
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BUS 81	California Income Tax Procedures	1
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C S 19	Electronic Spreadsheets for Microcomputers	3
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## ADMINISTRATIVE ASSISTANT CERTIFICATE

**Total Units Required 34.5 - 36.5**

**Required Courses**

BIM 2	Intermediate Keyboarding: WordPerfect	3.5
BIM 7A	Beginning Word Processing: Word for Windows	4
BIM 38	Office Procedures	3
BIM 42	Records Management & Filing	3
BUS 1A	Principles of Accounting	4

**OR**

BUS 10A	Vocational Accounting	3
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BUS 17A	Beginning Business Communication	3
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BUS 17B	Advance Business Communication	3
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GUID 33	Job Seeking Skills	1
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**AND**

(minimum of 5 to 6 units from the following courses)

BIM 31	Electronic Calculation	3
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**OR**

BIM 32A	Electronic Calculation	1
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**AND**

BIM 32B	Electronic Calculation	1
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**AND**

BIM 32C	Electronic Calculation	1
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BUS 15	Lotus 1-2-3 for Accounting	2
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C S 45	Microsoft Windows	1
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•ELECTIVES	See Group 1	6
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**•Group 1 (Electives)**

(minimum of 6 units from the following)

BIM 7B	Intermediate Word Processing: Concepts and Applications	3.5
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BIM 12D	Introduction to WordPerfect for Windows	1
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BIM 12E	WordPerfect for Windows: Tips and Shortcuts	1
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**OR**

BIM 12F	WordPerfect for Windows: Document Enhancement	1
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BIM 75	Applied Business Information Principles	1
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BUS 14	Microcomputers and Sm. Bus. Systems	3
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BUS 30	Supervision and Human Relations	3
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C S 43	Database Design (Micro)	3
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SPCH 1A	Fundamentals of Speech	3
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**OR**

BUS 6	Business and Professional Speaking	3
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**OR**

SPCH 7	Intercultural Communication	3
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**OR**

SPCH 3	Interpersonal Communication	3
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## BANK CUSTOMER SERVICE CERTIFICATE

**Total Units Required 22**

**Required Courses**

BUS 22	Professional Selling	3
BUS 82A	Business Mathematics 1	2
BUS 82B	Business Mathematics 2	2
C S/BUS 14	Microcomputers and Small Business Systems	3
BUS 61	Principles and Operations of Financial Institutions	3
•ELECTIVES	Group 1	9

**•Group 1 (Electives)**

(minimum of 9 units from the following)

BUS 20	Introduction to Business	3
BUS 18A	Foundations of Business Law	3
BUS 17	Business Communication	3
BUS 66	Principles of Money and Banking	3
SPCH 1A	Fundamentals of Speech	3
BIM 42	Records Management	3
BIM 1A	Beginning Keyboarding	1.5
SPCH 7	Intercultural Communication	3

## BANKING AND FINANCE CERTIFICATE

**Total Units Required 28**

**Required Courses**

BUS 61	Principles of Financial Institution Operations	3
BUS 63	Analysis of Financial Statements	3
BUS 65A	Introduction to Personal Loans	1
BUS 65B	Introduction to Business Loans	1
BUS 66	Principles of Money and Banking	3
BUS 1A	Principles of Accounting	4
BUS 1B	Principles of Accounting	4
•ELECTIVES	See Group 1	9

**•Group 1 (Electives)**

(minimum of 9 units from the following)

BUS 20	Introduction to Business	3
BUS 3	Financial Accounting	4
<b>OR</b>		
BUS 4	Managerial Accounting	4
BUS 18A	Business Law	3
<b>OR</b>		
BUS 18B	Business Law	3
BUS 22	Professional Selling	3
BUS 14	Microcomputers and Small Business Systems	3
BUS 17	Business Communication	3
BUS 26	Business Economics	3
BUS 68	Trust Functions and Services	3
BUS 42	Real Estate Finance	3

## BOOKKEEPING CERTIFICATE

**Total Units Required 23**

**Recommended Sequence:**

First Semester

BUS 10A	Vocational Accounting	3
BUS 82A	Business Mathematics 1	2
BUS 82B	Business Mathematics 2	2
BIM 32A	Beginning Office Calculation	1
BIM 32B	Intermediate Office Calculation	1
C S 45	Microsoft Windows	1
•ELECTIVE	See Group 1	3

Second Semester

BUS 10B	Vocational Accounting	3
<b>OR</b>		
BUS 70	Payroll Accounting (Manual)	2
<b>AND</b>		
BUS 71	Computerized Payroll Accounting	1
BUS 82C	Business Mathematics 3	2
BIM 32C	Advanced Office Calculation	1
••ELECTIVES	See Group 2	4

**•Group 1 (Elective)**

(one course from the following)

BUS 18A	Business Law	3
BUS 20	Introduction to Business	3
BUS 11	Income Tax Procedures	3
BUS 67	Personal Finance	3

**••Group 2 (Electives)**

(minimum of 4 units from the following)

C S/BUS 14	Microcomputers and Small Business Systems	3
<b>OR</b>		
C S 20	Microsoft Word, Excel, and Access	3
BUS 13	Accounting on the Microcomputer	2
BUS 72	Quickbooks	1.5
BIM 1A	Beginning Keyboarding	1.5

## COMPUTER OPERATIONS CERTIFICATE

**Total Units Required 30-31.5**

**Recommended Sequence:**

First Semester

C S 11	Computer Science Fundamentals	3
C S 17	Computer Logic	3
C S 45	Microsoft Windows	1
•BIM 1A	Beginning Keyboarding	1.5

Second Semester

C S 54	Fundamentals of Data Communications	3
MATH 80	Elementary Algebra	4
	or above	
••ELECTIVE	See Group 1	3

Third Semester

C S 32	Computer Operations	3
<b>OR</b>		
C S 33	Systems Analysis and Design	3
C S 75	Applied Computer Science Principles	2
ENG 72	Technical Writing	3

Fourth Semester

C S 32	Computer Operations	3
<b>OR</b>		
C S 33	Systems Analysis and Design	3
C S 75	Applied Computer Science Principles	2

•or a typing certificate for 40 words per minute or better

**••Group 1 (Electives)**

(one course from the following)

C S 21	Applied BASIC Programming for Technology	3
C S 22A	RPG Programming	3
C S 24A	COBOL Programming	3
C S 25A	Assembly Language Programming (Macro)	3
C S 27	Engineering FORTRAN	3
C S 28A	BASIC Programming	3
C S 29	PASCAL Programming	3
C S 31	C Programming	3

## COMPUTER PROGRAMMING CERTIFICATE

**Total Units Required 45 - 48.5**

**Recommended Sequence:**

First Semester

C S 11	Computer Science Fundamentals	3
C S 17	Computer Logic	3
C S 45	Microsoft Windows	1
•BUS 1A	Principles of Accounting	4
<b>OR</b>		
BUS 10A	Vocational Accounting	3
••••BIM 1A	Beginning Keyboarding	1.5

## COMPUTER PROGRAMMING CERTIFICATE (Continued)

Second Semester

••CORE ELECTIVE	See Group 1 (one course)	3
C S 25A	Assembly Language Programming (Macro)	3
C S 54	Fundamentals of Data Communications	3
BUS 10B	Vocational Accounting (if applicable)	3
•••SKILLS		
REQU	See Group 2	3

Third Semester

••CORE		
ELECTIVE	See Group 1 (one course)	3
C S 32	Computer Operations	3
<b>OR</b>		
C S 33	Systems Analysis and Design	3
C S 75	Applied Computer Science Principles	2
•••SKILLS		
REQU	See Group 2	3

Fourth Semester

C S 32	Computer Operations	3
<b>OR</b>		
C S 33	Systems Analysis and Design	3
C S 75	Applied Computer Science Principles	2
•••SKILLS		
REQU	See Group 2	3
•••ELECTIVE	See Group 3	3

**•BUS 1A or BUS 10A and BUS 10B**

**••Group 1 (Core Elective)**

(one of the following combinations which includes a beginning and an advanced course in the same language)

C S 24A	COBOL Programming	3
C S 24B	Advanced COBOL Programming	3
<b>OR</b>		
C S 31	C Programming	3
C S 31B	C++ Programming	3
<b>OR</b>		
C S 21	Applied BASIC Programming for Technology	3
C S 28B	Visual BASIC Programming	3
<b>OR</b>		
C S 28A	BASIC Programming	3
C S 28B	Visual BASIC Programming	3

**•••Group 2 (Skills Requirement)**

(one course from the following)

MATH 20	Finite Mathematics	3
ENG 72	Technical Writing	3
SPCH 3	Interpersonal Communication	3

**••••Group 3 (Elective)**

(one course from the following)

C S 21	Applied BASIC Programming for Technology	3
C S 22A	RPG Programming	3
C S 27	Engineering FORTRAN	3
C S 28A	BASIC Programming	3
C S 29	PASCAL Programming	3
C S 24A	COBOL Programming	3
C S 31	C Programming	3

••••or a typing certificate for 40 words per minute or better.



## COMPUTER SCIENCE CERTIFICATE

Total Units Required 40-43

### Recommended Sequence:

#### First Semester

C S 11	Computer Science Fundamentals	3
C S 17	Computer Logic	3
•MATH	See Group I	3-5
C S 29	PASCAL Programming	4

#### Second Semester

C S 25A	Assembly Language Programming: (Macro)	3
C S 31	C Programming	3
•MATH	See Group I	3-5
ENG 1A	Written Communications	3

#### Third Semester

C S 31B	C++ Programming	3
C S 33	Systems Analysis and Design	3
•MATH	See Group I	3-5
SPCH 1A	Fundamentals of Speech	3

#### Fourth Semester

••ELECTIVES	See Group 2	6-10
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#### •Group I (Mathematics)

(minimum of three courses from the following)

MATH 1	Calculus	5
MATH 2	Calculus	4
MATH 3	Vector Calculus	4
MATH 4	Differential Equations	4
MATH 5	Linear Algebra	3
MATH 12	Introduction to Probability and Statistics	3
MATH 13	Survey of Calculus	3
MATH 20	Finite Mathematics	3

#### ••Group 2 (Electives)

(minimum of 6 to 10 units selected from the following)

BUS 1A	Principles of Accounting	4
BUS 1B	Principles of Accounting	4
BUS 4	Managerial Accounting	4
CHEM 1A	General Chemistry	5
C S 24A	COBOL Programming	3
C S 24B	Advanced COBOL Programming	3
C S 27	Engineering FORTRAN	3
C S 32	Computer Operations	3
C S 37	Programming in Smalltalk	3
C S 42	UNIX	3
C S 43	Database Design: Micro	3
C S 54	Fundamentals of Data Communications	3
ECON 1A	Principles of Economics	3
PHYS 4A	Principles of Physics: Mechanics	4
PHYS 4B	Principles of Physics: Waves, Sound, & Thermodynamics	4
PHYS 4C	Principles of Physics: Electricity & Magnetism	4

NOTE: Minimum units required is 40.

## COMPUTER SCIENCE MICROCOMPUTER SPECIALIST CERTIFICATE

### Applications Emphasis

Total Units Required 36 - 38

### Recommended Sequence:

#### First Semester

C S 11	Computer Science Fundamentals	3
C S 14	Micrometers and Small Business Systems	3
C S 45	Microsoft Windows	1
C S 70	Introduction to Internet	1

#### Second Semester

C S 18B	Microcomputers and Small Business: Apple Macintosh	3
•BUS 1A	Principles of Accounting	4
<b>OR</b>		
BUS 10A	Vocational Accounting	3
ENG 72	Technical Writing	3

#### Third Semester

C S 14B	Microcomputer Evaluation and Installation	3
C S 20	Microsoft Word, Excel, and Access	3
BIM 12D	Introduction to WordPerfect for Windows	1
BIM 12E	WordPerfect for Windows: Tips and Shortcuts	1
BIM 12F	WordPerfect for Windows: Document Enhancement	1
••BUS 10B	Vocational Accounting (if applicable)	3

#### Fourth Semester

C S 28A	BASIC Programming	3
C S 42	UNIX	3
C S 43	Database Design: (Micro)	3

•BUS 1A or BUS 10A and BUS 10B

••BUS 10B must be taken after BUS 10A

## COMPUTER SCIENCE MICROCOMPUTER SPECIALIST CERTIFICATE Technical Emphasis

Total Units Required 33 - 35

**Recommended Sequence:**

First Semester

C S 11	Computer Science Fundamentals	3
C S 14	Microcomputers and Small Business Systems	3
C S 45	Microsoft Windows	1
C S 70	Introduction to Internet	1

Second Semester

C S 17	Computer Logic	3
•BUS 1A	Principles of Accounting	4
<b>OR</b>		
BUS 10A	Vocational Accounting	3
ENG 72	Technical Writing	3

Third Semester

C S 25A	Assembly Language Programming: (Macro)	3
MATH 20	Finite Mathematics	3
••BUS 10B	Vocational Accounting (if applicable)	3

Fourth Semester

C S 31	C Programming	3
C S 42	UNIX	3
C S 54	Fundamentals of Data Communications	3

- BUS 1A or BUS 10A and BUS 10B
- BUS 10B must be taken after BUS 10A

## COMPUTER SCIENCE MICROCOMPUTER SPECIALIST CERTIFICATE Applications and Technical Emphasis

Total Units Required 51 -53

**Recommended Sequence:**

First Semester

C S 11	Computer Science Fundamentals	3
C S 14	Microcomputers and Small Business Systems	3
C S 17	Computer Logic	3
C S 45	Microsoft Windows	1
C S 70	Introduction to Internet	1

Second Semester

C S 18B	Microcomputers and Small Business: Apple Macintosh	3
C S 28A	BASIC Programming	3
•BUS 1A	Principles of Accounting	4
<b>OR</b>		
BUS 10A	Vocational Accounting	3
ENG 72	Technical Writing	3

Third Semester

C S 14B	Microcomputer Evaluation and Installation	3
C S 20	Microsoft Word, Excel, and Access	3
C S 25A	Assembly Language Programming: (Macro)	3
BIM 12D	Introduction to WordPerfect for Windows	1
BIM 12E	WordPerfect for Windows: Tips and Shortcuts	1
BIM 12F	WordPerfect for Windows: Document Enhancement	1
••BUS 10B	Vocational Accounting (if applicable)	3

Fourth Semester

C S 31	C Programming	3
C S 54	Fundamentals of Data Communications	3
C S 42	UNIX	3
C S 43	Database Design: (Micro)	3
MATH 20	Finite Mathematics	3

- BUS 1A or BUS 10A and BUS 10B
- BUS 10B must be taken after BUS 10A

## GENERAL OFFICE CERTIFICATE

**Total Units Required 32.5 - 33.5**

**Required Courses**

BIM 2	Intermediate Keyboarding: WordPerfect	3.5
BIM 7A	Beginning Word Processing: Word for Windows	4
BIM 38	Office Procedures	3
BIM 42	Records Management & Filing	3
BUS 1A	Principles of Accounting	4
<b>OR</b>		
BUS 10A	Vocational Accounting	3
BUS 17A	Beginning Business Communications	3
BUS 17B	Advanced Business Communications	3
GUID 33	Job Seeking Skills	1
•ELECTIVES	See Group 1	9

**•Group 1 (Electives)**

(minimum of 9 units from the following)

BIM 12D	Introduction to Word: Perfect for Windows	1
BIM 12E	WordPerfect for Windows: Tips & Shortcuts	1
BIM 12F	WordPerfect for Windows Document Enhancements	1
BIM 31	Electronic Calculation	3
<b>OR</b>		
BIM 32A	Beginning Office Calculation	1
<b>AND</b>		
BIM 32B	Intermediate Office Calculation	1
<b>AND</b>		
BIM 32C	Advanced Office Calculation	1
BIM 50	Machine Transcription	2
BIM 70A	Beginning Keyboarding for Speed & Accuracy	1.5
BIM 70B	Intermediate Keyboarding for Speed & Accuracy	1.5
BIM 70C	Advanced Keyboarding for Speed & Accuracy	1.5
BUS 13	Accounting on Microcomputer	2
<b>OR</b>		
BUS 15	Lotus 1-2-3 for Accounting	2
C S 45	Microsoft Windows	3
SPCH 7	Intercultural Communication	3
<b>OR</b>		
SPCH 3	Interpersonal Communication	3

## INFORMATION/WORD PROCESSING CERTIFICATE

**Total Units Required 36-37**

**Required Courses**

BIM 2	Intermediate Keyboarding: WordPerfect	3.5
BIM 7A	Beginning Word Processing: Concepts and Applications	4
BIM 38	Office Procedures	3
BIM 42	Records Management and Filing	3
BUS 1A	Principles of Accounting	4
<b>OR</b>		
BUS 10A	Vocational Accounting	3
BUS 17A	Beginning Business Communications	3
BUS 17B	Advanced Business Communications	3
GUID 33	Job Seeking Skills	1
BIM 7B	Intermediate Word Processing: Concepts and Applications	3.5
BIM 23A	Beginning Desktop Publishing: Using PageMaker	2
C S 45	Microsoft Windows	1
•ELECTIVES	See Group 1	6

**•Group 1 (Electives)**

(minimum of 6 units from the following)

BIM 12D	Introduction to WordPerfect for Windows	1
BIM 12E	WordPerfect for Windows: Tips and Shortcuts	1
<b>OR</b>		
BIM 12F	Word Perfect for Windows: Document Enhancement	1
BIM 21A	Introduction to Business Graphics	2
BIM 50	Machine Transcription	2
BIM 75	Applied Business Information Management Principles	1
SPCH 7	Intercultural Communication	3
<b>OR</b>		
SPCH 3	Interpersonal Communication	3

## KEY DATA ENTRY CERTIFICATE

**Total Units Required 17.5 - 20**

**Required Courses**

C S 11	Computer Science Fundamentals	3
C S 71	Key Data Entry	2.5
C S/BUS 14	Microcomputers and Small Business Systems	3
BIM 38	Office Procedures	3
C S 18B	Microcomputers and Small Business Systems: Apple Macintosh	3
•BIM 2	Intermediate Keyboarding	1.5
BUS 10A	Vocational Accounting	3
<b>OR</b>		
BUS 1A	Principles of Accounting	4

•or a typing certificate for 40 words per minute or better

## MERCHANDISING CERTIFICATE

Total Units Required 31 - 32

**Required Courses**

BUS 20	Introduction to Business	3
BUS 21	Marketing	3
BUS 22	Professional Selling	3
BUS 23	Advertising	3
BUS 30	Supervision and Human Relations	3
BUS 82A	Business Mathematics 1	2
<b>AND</b>		
BUS 82B	Business Mathematics 2	2
<b>OR</b>		
BUS 82B	Business Mathematics 2	2
<b>AND</b>		
BUS 82C	Business Mathematics 3	2
BUS 1A	Principles of Accounting	4
<b>OR</b>		
BUS 10A	Vocational Accounting	3
•ELECTIVE	See Group 1	3
••ELECTIVES	See Group 2	6

**•Group 1 (Elective)**

(one course from the following)

BUS 24	Retail Management	3
BUS 26	Economics of Business	3
SPCH 7	Intercultural Communication	3

**••Group 2 (Electives)**

(two courses from the following)

BUS 10B	Vocational Accounting	3
BUS 31	Introduction to Management	3
BUS 14	Microcomputers and Small Business Systems	3
BUS 60	Small Business Management	3
PSYCH 1	Introduction to Psychology	3

## OFFICE MANAGEMENT CERTIFICATE

Total Units Required 36.5 - 37.5

**Required Courses**

BIM 2	Intermediate Keyboarding: WordPerfect	3.5
BIM 7A	Beginning Word Processing: Word for Windows	4
BIM 38	Office Procedures	3
BIM 42	Records Management and Filing	3
BUS 1A	Principles of Accounting	4
<b>OR</b>		
BUS 10A	Vocational Accounting	3
BUS 17A	Beginning Business Communications	3
BUS 17B	Advanced Business Communications	3
GUID 33	Job Seeking Skills	1
BUS 20	Introduction to Business	3
BIM 39	Office Management	3
C S 45	Microsoft Windows	1
•ELECTIVES	See Group 1	6

**•Group 1 (Electives)**

(minimum of 6 units from the following)

BIM 21A	Introduction to Business Graphics	2
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**OR**

BIM 12D	Introduction to WordPerfect for Windows	1
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**AND**

BIM 12F	WordPerfect for Windows: Document Enhancement	1
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BIM 75	Applied Business Information Principles	1
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BUS 14	Microcomputers and Small Business Systems	3
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BUS 15	Lotus 1-2-3 for Accounting	2
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BUS 18A	Business Law	3
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BUS 30	Supervision and Human Relations	3
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C S 43	Database Design: (Macro)	1
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SPCH 7	Intercultural Communication	3
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**OR**

SPCH 3	Interpersonal Communication	3
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## REAL ESTATE CERTIFICATE

Total Units Required 21 - 22

**Recommended Sequence:**

First Semester

BUS 40	Real Estate Principles	3
••ELECTIVE	See Group 2	3 - 4

Subsequent Semesters

•CORE		
REQUIREMENTS	See Group I	12
••ELECTIVES	See Group 2	3 - 4

**•Group 1 ( Core Requirement)**

(all of the following courses)

BUS 41	Real Estate Practice	3
BUS 42	Real Estate Finance	3
BUS 43	Legal Aspects of Real Estate	3

**AND**

(one course from the following)

BUS 44	Real Estate Appraisal	3
BUS 45	Real Estate Economics	3
BUS 49A	Basic Escrow Procedures	3

**••Group 2 (Electives)**

(minimum of 6 units from the following)

BUS 1A	Principles of Accounting	4
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**OR**

BUS 10A	Vocational Accounting	3
BUS 3	Financial Accounting	4
BUS 8	Introduction to the American Legal System	3

**OR**

BUS 18A	Business Law	3
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**OR**

BUS 18B	Business Law	3
BUS/C S 14	Microcomputers and Small Business Systems	3
BUS 22	Professional Selling	3
BUS 23	Advertising	3
BUS 46	Property Management	3
BUS 82A	Business Mathematics 1	2

**AND**

BUS 82B	Business Mathematics 2	2
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**OR**

BUS 82B	Business Mathematics 2	2
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**AND**

BUS 82C	Business Mathematics 3	2
CONST 54	Estimating and Specifications	3

**NOTE:** BUS 40, Real Estate Principles, must be completed before qualifying to take the State examination for the sales license. Two additional courses must be completed within 18 months to retain the license. An applicant for broker licenses must have completed eight courses in addition to experience and other requirements. For additional information contact the Stockton Board of Realtors.

## RISK MANAGEMENT AND INSURANCE CERTIFICATE

Total Units Required 18

**Recommended Sequence:**

First Semester

BUS 20	Introduction to Business	3
BUS 74	Introduction to Risk Management and Insurance	3
C S/BUS 14	Microcomputers and Small Business Systems	3
<b>OR</b>		
C S 20	Microsoft Word, Excel, and Access	3

Second Semester

BUS 67	Personal Finance	3
BUS 22	Professional Selling	3
<b>OR</b>		
SPCH 7	Intercultural Communications	3
BUS 18A	Business Law	3
<b>OR</b>		
BUS 8	American Legal System	3
<b>OR</b>		
BUS 19	Legal Environment of Business	3

## SUPERVISION AND MANAGEMENT CERTIFICATE

**Total Units Required 24 - 27**

**Required Courses**

BUS 17A	Business Communication	3
BUS 18A	Business Law	3
BUS 20	Introduction to Business	3
BUS 30	Supervision and Human Relations	3
BUS 31	Introduction to Management	3
•C S/BUS 14	Microcomputers and Small Business Systems	3

**OR**

•C S 18B	Microcomputers and Small Business: Apple Macintosh	3
BUS 1A	Principles of Accounting	4

**OR**

BUS 10A	Vocational Accounting	3
••ELECTIVES	See Group 1	3
•••ELECTIVES	See Group 2	3

**•or demonstrated computer literacy**

**••Group 1 (Electives)**

(minimum of 3 units from the following)

BUS 32	Total Quality Management	3
BUS 36	Personnel Management	3
BUS 60	Small Business Management	3

**OR**

BUS 94A	Small Business Start-Up	1
<b>AND</b>		
BUS 94B	Essential Topics for Small Business	1
<b>AND</b>		
BUS 94C	The New Entrepreneur	1

**•••Group 2 (Electives)**

(minimum of 3 units from the following)

BUS 18B	Foundations of Business Law	3
BUS 26	Economics of Business	3
BUS 73A	Leadership for Supervisors	1
BUS 73B	Recruiting and Selecting Employees	1
BUS 82A	Business Mathematics 1	2
BUS 82B	Business Mathematics 2	2
BIM 39	Office Management	3
SPCH 7	Intercultural Communication	3

## TAX PREPARATION CERTIFICATE

**Total Units Required 26**

**Required Courses**

BUS 11	Income Tax Procedures	3
BUS 81	California Income Tax Procedures	1
BUS 1A	Principles of Accounting	4
BUS 1B	Principles of Accounting	4
BUS 3	Financial Accounting	4
BUS 4	Managerial Accounting	4
•ELECTIVES	See Group 1	6

**•Group 1 (Electives)**

(minimum of 6 units from the following)

BUS 20	Introduction to Business	3
BUS 13	Accounting on the Microcomputer	2
C S/BUS 14	Microcomputers & Small Business Systems	3
BUS 16	Computer Assisted Writing	0.5
BUS 18A	Foundations of Business Law	3
BUS 26	Economics of Business	3
BUS 82B	Business Mathematics 2	2
BUS 82C	Business Mathematics 3	2
C S 11	Computer Science Fundamentals	3
BIM 31	Electronic Calculation	3

**OR**

BIM 32A	Beginning Office Calculation	1
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**AND**

BIM 32B	Intermediate Office Calculation	1
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**AND**

BIM 32C	Advanced Office Calculation	1
BIM 33	Using Business Calculators	2

## ADVANCED TRANSPORTATION CERTIFICATE

Total Units Required 24 - 25

**Required Courses**

BUS 51	Introduction to Transportation	3
C S 11	Computer Science Fundamentals	3
<b>OR</b>		
C S/BUS 14	Microcomputers and Small Business Systems	3
BUS 10A	Vocational Accounting	3
<b>OR</b>		
BUS 1A	Principles of Accounting	4
•ELECTIVE	See Group 1	3
••ELECTIVES	See Group 2	3

**•Group 1 (Elective)**

(one course from the following)

BUS 56	Transportation: Export and Import	3
BUS 57	Physical Distribution and Warehousing	3
BUS 58	Transportation of Hazardous Materials	3

**••Group 2 (Electives)**

(minimum of 6 units from the following)

BUS 17A	Business Communication	3
BUS 20	Introduction to Business	3
BUS 21	Marketing	3
BUS 30	Supervision and Human Relations	3
BUS 31	Introduction to Management	3
BUS 32	Total Quality Management	3
BUS 82A	Business Mathematics 1	2
<b>AND</b>		
BUS 82B	Business Mathematics 2	2
<b>OR</b>		
BUS 82B	Business Mathematics 2	2
<b>AND</b>		
BUS 82C	Business Mathematics 3	2
BIM 39	Office Management	3

## INTRODUCTORY TRANSPORTATION CERTIFICATE

Total Units Required 15 - 16

**Required Courses**

BUS 51	Introduction to Transportation	3
C S 11	Computer Science Fundamentals	3
<b>OR</b>		
C S/BUS 14	Microcomputers and Small Business Systems	3
BUS 10A	Vocational Accounting	3
<b>OR</b>		
BUS 1A	Principles of Accounting	4
•ELECTIVE	See Group 1	3
••ELECTIVE	See Group 2	3

**•Group 1 (Elective)**

(minimum of 3 units from the following)

BUS 56	Transportation: Export and Import	3
BUS 57	Physical Distribution and Warehousing	3
BUS 58	Transportation of Hazardous Materials	3

**••Group 2 (Elective)**

(minimum of 3 units from the following)

BUS 17A	Business Communication	3
BUS 21	Marketing	3
BUS 30	Supervision and Human Relations	3
BUS 31	Introduction to Management	3
BUS 82A	Business Mathematics 1	2
<b>AND</b>		
BUS 82B	Business Mathematics 2	2
<b>OR</b>		
BUS 82B	Business Mathematics 2	2
<b>AND</b>		
BUS 82C	Business Mathematics 3	2
BIM 39	Office Management	3

## ARCHITECTURAL DRAFTING CERTIFICATE

**Total Units Required 40**

**Recommended Sequence:**

First Semester

ARCH 1	Basic Architectural Drafting	3
ARCH 8	Materials of Construction	3

Second Semester

ARCH 9	Design Fundamentals	3
ARCH 12	Computer Aided Drafting	3
CONST 89	Methods and Planning	3
MATH 80	Elementary Algebra	4

Third Semester

ARCH 16	Descriptive Drawing and Rendering	3
ARCH 2	Architectural Practice: Working Drawings	6
CONST 78	The Uniform Building Code	2

Fourth Semester

ARCH 3	Architectural Presentations	3
ARCH 5	Architectural Detailing	3
E TECH 41	Civil Drafting: Site Design and Improvement	4

## CARPENTRY TECHNOLOGY CERTIFICATE

**Total Units Required 45**

**Required Courses**

CONST 10	Wood Technology	5
CONST 62A	Carpentry	10
CONST 62B	Carpentry	10
ARCH 1	Basic Architectural Drafting	3
CONST 54	Estimating and Specifications	3
CONST 78	Uniform Building Code	2
INDUS 20	Industrial Safety & Health	3
INDUS 94	Industrial Mathematics	3
•ELECTIVES	See Group 1	6

**•Group 1 (Electives)**

(minimum of 6 units from the following)

ARCH 73	Blueprint Reading	3
BUS 60	Small Business Management	3
CONST 51B	Mill Cabinet	4
CONST 62C	Carpentry	10
CONST 79	Legal Aspects of Construction Law	2
CONST 89	Methods & Planning	3

## CONSTRUCTION TECHNOLOGY CERTIFICATE

**Total Units Required 40 - 43**

**Recommended Sequence:**

First Semester

ARCH 1	Basic Architectural Drafting	3
ARCH 8	Materials of Construction	3
MATH 80	Elementary Algebra	4

Second Semester

ARCH 12	Computer Aided Drafting	3
CONST 54	Estimating and Specifications	3
CONST 73	Blueprint Reading	4

Third Semester

BUS 18A	Business Law	3
C S 14	Microcomputers and Small Business Systems	3
CONST 78	The Uniform Building Code	2

Fourth Semester

INDUS 20	Industrial Safety and Health	3
E TECH 46	Mechanical and Electrical Systems	3
CONST 89	Methods and Planning	3

**IN ADDITION**

(one from the following)

BUS 60	Small Business Management	3
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**OR**

BUS 94A	Small Business Startup	1
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**AND**

BUS 94B	Small Business Startup	1
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**AND**

BUS 94C	Small Business Startup	1
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**OR**

ARCH 2	Architectural Practice: Working Drawings	6
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# CONSTRUCTION TECHNOLOGY CERTIFICATE

## Evening Program

**Total Units Required 39 - 41**

**Recommended Sequence:**

First Semester

ARCH 1	Basic Architectural Drafting	3
ARCH 8	Materials of Construction	3

Second Semester

ARCH 58A	Computer Aided Drafting	3
BUS 18A	Business Law	3

Third Semester

CONST 54	Estimating and Specifications	3
MATH 80	Elementary Algebra	4

Fourth Semester

INDUS 20	Industrial Safety and Health	3
CONST 73	Blueprint Reading	3

Fifth Semester

C S 14	Microcomputers and Small Business Systems	3
CONST 78	The Uniform Building Code	2

Sixth Semester

E TECH 46	Mechanical and Electrical Systems	3
CONST 89	Methods and Planning	3

**IN ADDITION**

(one of the following)

BUS 60	Small Business Management	3
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**OR**

BUS 94A	Small Business Startup	1
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**AND**

BUS 94B	Small Business Startup	1
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**AND**

BUS 94C	Small Business Startup	1
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**OR**

ARCH 2	Architectural Practice	6
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# MILL CABINET TECHNOLOGY CERTIFICATE

**Total Units Required 35 - 39**

**Required Courses**

CONST 10	Wood Technology	5
CONST 51B	Mill Cabinet	4
CONST 51C	Mill Cabinet	4
CONST 51D	Mill Cabinet	4
ARCH 1	Basic Architectural Drafting	3
CONST 54	Estimating and Specification	3
INDUS 20	Industrial Safety and Health	3
INDUS 94	Industrial Mathematics	3
•ELECTIVES	See Group 1	6 - 10

**•Group 1 (Electives)**

(minimum of 6 to 10 units from the following)

CONST 62A	Residential Carpentry	10
CONST 62B	Residential Carpentry	10
CONST 84	Construction Law	3
CONST 89	Methods and Planning	3
INDUS 97	Industrial Relations	3

# APPAREL DESIGN CERTIFICATE

**Total Units Required 32 - 33**

**Required Courses**

FCS 42	Textiles	3
FCS 43	Origins of Fashion	3
FCS 44	Clothing in Contemporary Society	3
FCS 47A	Clothing Construction	3
FCS 47B	Clothing Construction	3
FCS 48A	Flat Pattern Design	3
FCS 48B	Fashion Apparel	3
FCS 49A	Custom Clothing Techniques	3
•ELECTIVES	See Group 1	8

**•Group 1 (Electives)**

(minimum of 8 units from the following)

FCS 40	Introduction to Fashion Merchandising	3
FCS 41	Fashion Product Knowledge	3
FCS 49B	Custom Clothing Techniques	3
FCS 51	Fashion Illustration	3
FCS 52	Fashion Field Study	2 - 3

## CARE PROVIDER TRAINING CERTIFICATE

**Total Units Required 11**

**Required Courses**

H S 72A	Mental Disabilities	1
H S 72B	Psychotropic Medications	1
H S 72C	Behavior Management	1
H S 72D	Normalization	1
H S 72E	Pre-Independent Living Training	1
H S 72F	Community Resources and Program Planning	1
H S 72G	Recognizing Other Needs of the Resident	1
H S 72H	Client Recordkeeping	1
H S 72I	Nutrition	1
H ED 32	Community First Aid and Safety	2

## CULINARY ARTS CERTIFICATE

**Total Units Required 38**

**Recommended Sequence:**

First Semester

CUL ART 1	Introduction to the Hospitality Industry	2
CUL ART 4	Food and Beverage Cost Technology	2
CUL ART 5	Commercial Food Preparation	4
CUL ART 7	Baking	3

Second Semester

CUL ART 9	Restaurant Operations	6.5
CUL ART 11	Menu Planning	1.5
CUL ART 13	Purchasing and Receiving	1.5
CUL ART 25	Foodservice Management	2

Third Semester

CUL ART 3	Safety and Sanitation	2
CUL ART 19	Kitchen Management	6.5
CUL ART 27	Garde Manger	1.5
CUL ART 29	Beverage Management	1.5
H EC 93V	Work Experience	1
FCS 6	Nutrition	3

## BASIC CULINARY ARTS CERTIFICATE

**Total Units Required 8**

**Recommended Sequence:**

First Semester

CUL ART 1	Introductory to the Hospitality Industry	2
CUL ART 3	Safety and Sanitation	2
CUL ART 5	Commercial Food Preparation	4

## DIETARY SERVICE SUPERVISOR CERTIFICATE

**Total Units Required 17**

**Recommended Sequence:**

First Semester

CUL ART 3	Safety and Sanitation	2
CUL ART 5	Commercial Food Preparation	4
FCS 6	Nutrition	3

Second Semester

FCS 91	Medical Nutrition Therapy	3
CUL ART 25	Food Service Management	2
FCS 50H	Special Studies: Family & Consumer Science	3

## EARLY CHILDHOOD EDUCATION CERTIFICATE ADVANCED

Required Courses	Total Units Required	43
FCS 21	Child Development	3
FCS 26	Child, Family, and Community	3
FCS 29	ECE Experiences: Arts & Science	3
FCS 30	ECE Experiences: Language Arts	3
FCS 31A	ECE Theory: Working with Children	3
FCS 31B	ECE Theory: Cognitive Development	3
FCS 32A	ECE Practicum Laboratory	3
FCS 32B	ECE Practicum Laboratory	3
<b>•GEN EDUC</b>		
REQUIRE	See Group 1	16
••ELECTIVES	See Group 2	3

**•Group 1 (General Education Requirements)**  
 (minimum of one course from the following Associate degree general education areas)  
 Learning Skills: Group A  
 Learning Skills: Group B  
 Humanities  
 Social Sciences

**••Group 2 (Electives)**  
 (minimum of three units selected from the following)

FCS 25	Studying and Observing Children	2
FCS 28	Health and Safety in Child Care	2
FCS 33	Infant Development and Caregiving	3
FCS 34	Children with Special Needs	3
FCS 35	Nutrition and Food for Children	3
FCS 36	Activities & Environments: School Age Child Care	3
FCS 37	Administration of Child Care Programs	3
FCS 38	Development & Financial Management of Child Care Programs	3
FCS 63	Child Discipline	1
FCS 71	Children, Imagination, and Books	1
FCS 72	Play and Learning	1
FCS 73	Preschool Art	1
FCS 74	Preschool Science	1
FCS 78	Child Day Care: Nutrition and Meal Planning	2
EDUC 10	Introduction to Education	3 - 4

## BASIC EARLY CHILDHOOD EDUCATION CERTIFICATE

**Total Units Required 24**

Required Courses		
FCS 21	Child Development	3
FCS 26	Child, Family & Community	3
FCS 29	ECE Experiences: Arts & Science	3
FCS 30	ECE Experiences: Language Arts	3
FCS 31A	ECE Theory: Working With Children	3
FCS 31B	ECE Theory: Cognitive Development	3
FCS 32A	ECE Practicum Laboratory	3
FCS 32B	ECE Practicum Laboratory	3

## FAMILY AND CONSUMER SCIENCES CERTIFICATE Life Management

**Total Units Required 36**

Required Courses		
FCS 2	Life Management	3
FCS 5	Nutrition	3
OR		
FCS 6	Basic Nutrition	3
FCS 8	Food Preparation	3
FCS 10	Interior Design	3
FCS 3	Home Management & Finance	3
FCS 21	Child Development	3
FCS 23	Marriage and the Family	3
FCS 42	Textiles	3
FCS 47A	Clothing Construction	3
•ELECTIVES	See Group 1	9

**•Group 1 (Electives)**  
 (minimum of 9 units from any courses in the following departments)  
 Family and Consumer Sciences  
 Culinary Arts

## FAMILY DAY CARE PROVIDER CERTIFICATE

Required Courses	Total Units Required	7
FCS 21      Child Development	3	
FCS 63      Child Discipline	1	
•FCS 70     Introduction to Family Day Care	1	
••H ED 30   Standard First Aid	1	
•Individuals who are already licensed Family Day Care Providers may substitute one unit from the following:		
FCS 70      Introduction to Family Day Care	1	
FCS 71      Children, Imagination, and Books	1	
FCS 72      Play and Learning	1	
FCS 73      Preschool Art	1	
FCS 74      Preschool Science	1	

••A current Red Cross CPR and First Aid Certificate may be substituted for H ED 30.

## FASHION MERCHANDISING CERTIFICATE

Required Courses	Total Units Required	33
FCS 40      Introduction to Fashion Merchandising	3	
FCS 41      Fashion Product Knowledge	3	
FCS 42      Textiles	3	
FCS 43      Origins of Fashion	3	
FCS 44      Clothing in Contemporary Society	3	
FCS 45      Fashion Sales & Promotion	3	
FCS 46      Visual Merchandising	3	
FCS 47A     Clothing Construction	3	
FCS 52      Fashion Field Study	3	
•ELECTIVES   See Group 1	6	
•Group 1 (Electives)		
(minimum of 6 units from the following)		
BUS 21      Marketing	3	
BUS 22      Professional Selling	3	
BUS 23      Advertising	3	
BUS 82      Business Mathematics	2	
<b>OR</b>		
BUS 10A     Vocational Accounting	3	
BUS 1A      Principles of Accounting	4	
<b>OR</b>		
MATH        (any course)	3 - 4	
SPCH 1A     Fundamentals of Speech	3	

## INTERIOR DESIGN CERTIFICATE

Required Courses	Total Units Required	30
FCS 10      Interior Design	3	
FCS 11      Applied Interior Design	3	
FCS 12      History of Furniture	3	
FCS 13      Specifications and Professional Practices	3	
FCS 42      Textiles	3	
ARCH 1      Basic Architectural Drafting	3	
ART 1A      Art History	3	
<b>OR</b>		
ART 1B      Art History	3	
ART 16      Descriptive Drawing & Rendering	3	
•ELECTIVES   See Group 1	6	
•Group 1 (Electives)		
(minimum of 6 units from the following)		
FCS 14      Lighting Design	3	
FCS 50H     Special Studies	1 - 2	
ARCH 2A     Architectural Practice: Design	5	
BUS 1A      Principles of Accounting	4	
CONST 78    Uniform Building Code	2	

## ARCHITECTURAL DRAFTING: ENGINEERING OPTION CERTIFICATE

Recommended Sequence:	Total Units Required	42
<u>First Semester</u>		
ARCH 1      Basic Architectural Drafting	3	
ARCH 8      Materials of Construction	3	
<u>Second Semester</u>		
ARCH 12     Computer Aided Drafting	3	
CONST 89    Methods and Planning	3	
MATH 87     Technical Mathematics	5	
<u>Third Semester</u>		
ARCH 2      Architectural Practice: Working Drawings	6	
CONST 78    The Uniform Building Code	2	
E TECH 31   Fundamentals of Civil Drafting	4	
E TECH 32   Technical Statics	3	
<u>Fourth Semester</u>		
ARCH 5      Architectural Detailing	3	
E TECH 41   Civil Drafting: Site Design and Improvement	4	
E TECH 46   Mechanical and Electrical Systems	3	

## CIVIL ENGINEERING TECHNICIAN CERTIFICATE

Total Units Required 48 - 50

**Recommended Sequence:**

First Semester

ENGR 1	Introduction to Engineering and Technology	3
E TECH 11	Engineering Drafting	3
E TECH 12	Computer-Aided Drafting	3
ENG 1A	Written Communication	3
<b>OR</b>		
ENG 79	Preparatory English	5

Second Semester

E TECH 20	Materials and Measurements	4
ENGR 2	Engineering Graphics	4
•MATH 87	Technical Mathematics	5

Third Semester

E TECH 31	Fundamentals of Civil Drafting	4
ENGR 10	Surveying	3

**OR**

E TECH 70	Applied Surveying	3
E TECH 32	Technical Statics	3

**OR**

E TECH 72	Applied Statics	3
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Fourth Semester

E TECH 41	Civil Drafting: Site Design and Improvement	4
ENGR 20	Surveying	3

**OR**

E TECH 80	Applied Surveying	3
E TECH 42	Technical Strength of Materials	3

**OR**

E TECH 82	Applied Strength of Materials	3
E TECH 43	Principles of Fluid Mechanics	3

**OR**

E TECH 83	Applied Fluid Mechanics	3
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•Recommended General Education Mathematics Elective or another mathematics course from MATH 31, 36, 1, 2, 3, 4, or 5

## CIVIL ENGINEERING TECHNICIAN CERTIFICATE

Degree Option

Total Units Required 67

**Recommended Sequence:**

First Semester

ENGR 1	Introduction to Engineering and Technology	3
E TECH 11	Engineering Drafting	3
E TECH 12	Computer Aided Drafting	3
•C S 11	Computer Science Fundamentals	3
•ENG 1A	Written Communications	3
•SPCH 1A	Fundamentals of Speech	3

Second Semester

E TECH 20	Materials and Measurements	4
ENGR 2	Engineering Graphics	4
•PHYS 10	Introduction to Physics	4
••MATH 87	Technical Mathematics	5

Third Semester

E TECH 31	Fundamentals of Civil Drafting	4
ENGR 10	Surveying	3

**OR**

E TECH 70	Applied Surveying	3
E TECH 32	Technical Statics	3

**OR**

E TECH 72	Applied Statics	3
•POLSC 1	American Government and Institutions	3
•ART 4	Exploring Art	3

Fourth Semester

E TECH 41	Civil Drafting: Site Design and Improvement	4
ENGR 20	Surveying	3

**OR**

E TECH 80	Applied Surveying	3
E TECH 42	Technical Strength of Materials	3

**OR**

E TECH 82	Applied Strength of Materials	3
E TECH 43	Principles of Fluid Mechanics	3

**OR**

E TECH 83	Applied Fluid Mechanics	3
•ECON 1A	Principles of Economics (Macro)	3

•Recommended General Education Electives

••Recommended General Education Mathematics Elective or another mathematics course from MATH 31, 36, 1, 2, 3, 4, or 5

# ELECTRONICS/ ELECTRICAL ENGINEERING TECHNICIAN CERTIFICATE

## Degree Option

**Total Units Required 70**

**Recommended Sequence:**

First Semester

ENGR 1	Introduction to Engineering and Technology	3
E TECH 11	Engineering Drafting	3
E TECH 12	Computer Aided Drafting	3
•C S 11	Computer Science Fundamentals	3
•ENG 1A	Written Communications	3
•SPCH 1A	Fundamentals of Speech	3

Second Semester

ENGR 2	Engineering Graphics	4
ELECT 11	AC and DC Network Analysis	4.5
•PHYS 10	Introduction to Physics	4
••MATH 87	Technical Mathematics	5

Third Semester

E TECH 37	Electronic Drafting	3
••ELECTIVE	E TECH ELECTIVE (see note below)	3
ELECT 12	Solid State Devices	6
•POLSC 1	American Government and Institutions	3
•ART 4	Exploring Art	3

Fourth Semester

E TECH 20	Materials and Measurements	4
E TECH 46	Mechanical and Electrical Systems	3
E TECH 47	Control Systems	2
ELECT 13A	Integrated Circuits	4.5
•ECON 1A	Principles of Economics (Macro)	3

•Recommended General Education Electives

••Recommended General Education Mathematics Elective or another mathematics course from MATH 31, 36, 1, 2, 3, 4, or 5

••E TECH elective to be selected in conjunction with E TECH faculty advisor

# ELECTRONICS/ ENGINEERING TECHNICIAN CERTIFICATE

**Total Units Required 51 - 53**

**Recommended Sequence:**

First Semester

ENGR 1	Introduction to Engineering and Technology	3
E TECH 11	Engineering Drafting	3
E TECH 12	Computer-Aided Drafting	3
ENG 1A	Written Communications	3

**OR**

ENG 79	Preparatory English	5
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Second Semester

ENGR 2	Engineering Graphics	4
ELECT 11	AC and DC Network Analysis	4.5
•MATH 87	Technical Mathematics	5

Third Semester

E TECH 37	Electronic Drafting	3
••ELECTIVE	E TECH ELECTIVE (See note below)	3
E TECH 12	Solid State Devices	6

Fourth Semester

E TECH 13A	Integrated Circuits	4.5
E TECH 20	Materials and Measurements	4
E TECH 46	Mechanical and Electrical Systems	3
E TECH 47	Control Systems	2

•Recommended General Education Mathematics Elective or another mathematics course from MATH 31, 36, 1, 2, 3, 4, or 5

••E TECH elective to be selected in conjunction with E TECH faculty advisor

## ENGINEERING CERTIFICATE

Total Units Required 61

### Recommended Sequence:

#### First Semester

ENGR 1	Introduction to Engineering and Technology	3
MATH 1	Calculus	5
CHEM 1A	General Chemistry	5
ENG 1A	Written Communication	3

#### Second Semester

ENGR 2	Engineering Graphics	4
MATH 2	Calculus	4
CHEM 1B	General Chemistry	5
PHYS 4A	Principles of Physics: Mechanics	4

#### Third Semester

ENGR 4	Engineering Materials	3
ENGR 27	Engineering FORTRAN	3

#### **OR**

C S 27	Engineering FORTRAN	3
MATH 3	Vector Calculus	4
PHYS 4B	Principles of Physics: Wave, Sound, and Thermodynamics	4

#### Fourth Semester

ENGR 8	Statics	3
ENGR 6	Engineering Circuit Analysis	4
MATH 4	Differential Equations	3
PHYS 4C	Principles of Physics: Electricity and Magnetism	4

## FLUID POWER ENGINEERING TECHNOLOGY CERTIFICATE

Total Units Required 62.5

### Recommended Sequence:

#### First Semester

INDUS 31	Hydraulics and Pneumatics	4
PHYS 10	Introduction to Physics	4
MATH 82	Intermediate Algebra	4
ENG 72	Technical Writing	3

#### Second Semester

INDUS 35	Mobile Hydraulics	4
INDUS 37	Industrial Pneumatics	4
ELECT 11	AC and DC Network Analysis	5
ENG 1A	Written Communications	3

#### Third Semester

MECH 15	Machine Tool Process	4
ENGR 73	Trade Technician Drafting Skills	3
ELECT 13A	Integrated Circuits	4.5
MATH 36	Precalculus	5
<b>OR</b>		
MATH 87	Technical Mathematics	5

#### Fourth Semester

INDUS 87	Fluid Power Specialization	2
INDUS 41	Instrumentation and Process Control	3
ELECT 16	Introduction to Microprocessor	4
E TECH 12	Computer Aided Drafting	3
SPCH 1A	Fundamentals of Speech	3

# MECHANICAL ENGINEERING TECHNICIAN CERTIFICATE

**Total Units Required 51 - 53**

**Recommended Sequence:**

First Semester

ENGR 1	Introduction to Engineering and Technology	3
E TECH 11	Engineering Drafting	3
E TECH 12	Computer Aided Drafting	3
ENG 1A	Written Communications	3
<b>OR</b>		
ENG 79	Preparatory English	5

Second Semester

E TECH 20	Materials and Measurements	4
ENGR 2	Engineering Graphics	4
•MATH 87	Technical Mathematics	5

Third Semester

E TECH 34	Machine Drafting	3
E TECH 35	Machine Design	3
MECH 15	Machine Tool Processes	3
E TECH 32	Technical Statics	3
<b>OR</b>		
E TECH 72	Applied Statics	3

Fourth Semester

E TECH 45	Practical Machine Design	3
E TECH 46	Mechanical and Electrical Systems	3
E TECH 47	Control Systems	2
E TECH 42	Technical Strength of Materials	3
<b>OR</b>		
E TECH 82	Applied Strength of Materials	3
E TECH 43	Principles of Fluid Mechanics	3
<b>OR</b>		
E TECH 83	Applied Fluid Mechanics	3

**•Recommended General Education Mathematics Elective or another mathematics course from MATH 31, 36, 1, 2, 3, 4, or 5**

# MECHANICAL ENGINEERING TECHNICIAN CERTIFICATE

**Degree Option**

**Total Units Required 70**

**Recommended Sequence:**

First Semester

ENGR 1	Introduction to Engineering and Technology	3
E TECH 11	Engineering Drafting	3
E TECH 12	Computer Aided Drafting	3
•C S 11	Computer Science Fundamentals	3
•ENG 1A	Written Communications	3
•SPCH 1A	Fundamentals of Speech	3

Second Semester

E TECH 20	Materials and Measurements	4
ENGR 2	Engineering Graphics	4
•PHYSC 10	Introduction to Physics	4
••MATH 87	Technical Mathematics	5

Third Semester

E TECH 34	Machine Drafting	3
E TECH 35	Machine Design	3
MECH 15	Machine Tool Processes	3
E TECH 32	Technical Statics	3
<b>OR</b>		
E TECH 72	Applied Statics	3
•POLSC 1	American Government and Institutions	3
•ART 4	Exploring Art	3

Fourth Semester

E TECH 45	Practical Machine Design	3
E TECH 46	Mechanical and Electrical Systems	3
E TECH 47	Control Systems	2
E TECH 42	Technical Strength of Materials	3
<b>OR</b>		
E TECH 82	Applied Strength of Materials	3
E TECH 43	Principles of Fluid Mechanics	3
<b>OR</b>		
E TECH 83	Applied Fluid Mechanics	3
•ECON 1A	Principles of Economics (Macro)	3

**•Recommended General Education Electives**

**••Recommended General Education Mathematics Elective or another mathematics course from MATH 31, 36, 1, 2, 3, 4, or 5**



## CORRECTIONAL SCIENCE CERTIFICATE

**Total Units Required 24**

**Recommended Sequence:**

First Semester

AJ 22	Concepts of Criminal Law	3
AJ 51	Introduction to Correctional Science	3
AJ 53	Correctional Interviewing and Interventions	3
•ELECTIVE	See Group 1	3

Second Semester

AJ 31	Report Preparation	3
AJ 55	Control and Supervision in Corrections	3
AJ 57	Legal Aspects of Corrections	3
•ELECTIVE	See Group 1	3

**•Group 1 (Electives)**

(two course from the following)

AJ 28	Juvenile Law and Procedures	3
AJ 41	Narcotics Investigation and Control	3
AJ 54	Introduction to Probation and Parole	3

## FIRE TECHNOLOGY CERTIFICATE

**Total Units Required 33 - 35**

**Required Courses**

FIRE 1	Introduction to Fire Technology	3
FIRE 3	Essentials of Firefighting	3
FIRE 5	Fundamentals of Fire Prevention	3
FIRE 6	Fire Protection Equipment and Systems	3
FIRE 24	Firefighting Strategy and Tactics I	3
FIRE 28	Fire Hydraulics	3
FIRE 77B	Emergency Medical Technician I	5

**OR**

FIRE 2	Fundamentals of Personal Fire Safety and Emergency Care	3
•ELECTIVES	See Group I	12

**•Group I (Electives)**

(one course from the following)

ENG 1A	Written Communications	3
SPCH 1A	Fundamentals of Speech	3
SPCH 3	Interpersonal Communication	3
ENG 72	Technical Writing	3
ENG 79	Preparatory English	5
CHEM 3A	Introduction to Chemistry	4

**AND**

(one of the following)

BUS 82B	Business Mathematics 2	2
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**AND**

BUS 82C	Business Mathematics 3	2
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**OR**

MATH 80	Elementary Algebra	4
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**AND**

(minimum of 3 units from the following)

PSYCH 1	Introduction to Psychology	3
PSYCH 20	Stress Management	1

**AND**

(one course from the following)

FIRE 25	Firefighting Strategy and Tactics	2
FIRE 35	Fire Investigation	3

## LAW ENFORCEMENT CERTIFICATE

Total Units Required 46 - 47

**Required Courses**

A J 21	Administration of Justice	3
A J 22	Concepts of Criminal Law	3
A J 23	Procedures in the Justice System	3
A J 24	Legal Aspects of Evidence	3
A J 25	Criminal Investigation	3
A J 31	Police Report Writing	3
A J 40	Community Relations	3
ENG 1A	Written Communications	3
SPCH 1A	Fundamentals of Speech	3
MATH 80	Elementary Algebra	4
C S 11	Computer Science Fundamentals	3
SOCIO 1A	Introduction to Sociology	3
POLSC 1	American Government and Institutions	3
<b>OR</b>		
HIST 17A	History of the U. S.	3
<b>OR</b>		
HIST 17B	History of the U. S.	3
•NAT SCI	See Group 1	3 - 4
••HUM	See Group 2	3

**•Group 1 (Natural Science)**

(one course from Group 1, Natural Science, general education requirement for the Associate degree) 3

**••Group 2 (Humanities)**

(one course from Group III, Humanities, general education requirement for the Associate degree) 3

**NOTE:** The following courses are suggested electives, but they are not required.

A J 26	Patrol Procedures	3
A J 28	Juvenile Law and Procedures	3
A J 41	Narcotics Investigation and Control	3
Foreign Lang.	Same Language	5 - 10

## EDUCATION AIDE CERTIFICATE

Total Units Required 25 - 27

**Required Courses**

EDUC 10	Introduction to Education	4
SOCIO 1A	Introduction to Sociology	3
<b>OR</b>		
PSYCH 1	Introduction to Psychology	3
SOCIO 33	Social Inequality in the United States	3
SPCH 1A	Fundamentals of Speech	3
ENG 1A	Written Communications	3
FCS 21	Child Development	3
PSYCH 45A	Beginning Field Practicum	2
<b>OR</b>		
SOCIO 45A	Beginning Field Practicum	2
C S 20	Microsoft Word, Excel, and Access	3
•ELECTIVES	See Group 1	
 <b>•Group 1 (Electives)</b>		
(one course from the following )		
ART 4 Exploring Art		3
DRAMA 6A	Beginning Improvisational Theatre	2
MUSIC 36A	Class Piano	1

## ELIGIBILITY WORKER CERTIFICATE

Total Units Required 24 - 28

**Recommended Sequence:**Fall Semester

SOCIO 1A	Introduction to Sociology	3
SOCIO 24	Social Welfare	3
SOCIO 45A	Sociology Field Practicum	1
BUS 14/C S 14	Microcomputers and Small Business Systems	3

**OR**

C S 11	Computer Science Fundamentals	3
ENG 1A	Written Communications	3

**OR**

ENG 79	Preparatory English	5
•ELECTIVE	See Group 1	2 - 3

Spring Semester

SOCIO 1B	Problems of a Changing Society	3
SOCIO 33	Social Inequality in the U. S.	3
SOCIO 45B	Sociology Field Practicum	1
•ELECTIVE	See Group 1	2 - 3

**•Group 1 (Electives)**

(Minimum of one course from each category)

Category A:

SOCIO 27	Gender in Contemporary Society	3
SOCIO 30	American Immigrant Experience	3

Category B:

PSYCH 52	Introduction to Substance & Abuse Counseling	3
PSYCH 53	Drugs and Society	2
PSYCH 55	Introduction to Child Abuse Counseling	2
PSYCH 56	Assisting Sexual Assault Victims	2

**AND**

Must have achieved Level II on the mathematical portion of the assessment test, or have completed a Level II mathematical course.

## HUMAN SERVICES WORKER CERTIFICATE

Total Units Required 26 - 28

**Recommended Sequence:**First Semester

PSYCH 1	Introduction to Psychology	3
PSYCH 38	Counseling Skills for Human Service Workers	3
PSYCH 39	Client Interview, Evaluation, and Referral	2
PSYCH 45A	Beginning Field Practicum	2
PSYCH 46	Individual Counseling in Human Service Programs	3

Second Semester

PSYCH 40	Case Management and Treatment Planning	3
PSYCH 45B	Intermediate Field Practicum	2
PSYCH 47	Group Counseling in Human Service Programs	3
PSYCH 48	Family Counseling in Human Service Programs	2

**Additional Requirement**

ENG 1A	Written Communications	3
<b>OR</b>		
ENG 79	Preparatory English	5

## HUMAN SERVICES WORKER CERTIFICATE

### Family Abuse Specialist

Total Units Required 30 - 32

**Recommended Sequence:**

First Semester

PSYCH 1	Introduction to Psychology	3
PSYCH 38	Counseling Skills for Human Service Workers	3
PSYCH 39	Client Interview, Evaluation, and Referral	2
PSYCH 45A	Beginning Field Practicum	2
PSYCH 46	Individual Counseling in Human Service Programs	3

Second Semester

PSYCH 40	Case Management and Treatment Planning	3
PSYCH 45B	Intermediate Field Practicum	2
PSYCH 47	Group Counseling in Human Service Programs	3
PSYCH 48	Family Counseling in Human Service Programs	2

Third Semester

PSYCH 55	Introduction to Child Abuse Counseling	2
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Fourth Semester

PSYCH 56	Assisting Sexual Assault Victims	2
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**Additional Requirement**

ENG 1A	Written Communications	3
<b>OR</b>		
ENG 79	Preparatory English	5

## HUMAN SERVICES WORKER CERTIFICATE

### Gerontology Specialist

Total Units Required 30 - 32

**Recommended Sequence:**

First Semester

PSYCH 1	Introduction to Psychology	3
PSYCH 38	Counseling Skills for Human Service Workers	3
PSYCH 39	Client Interview, Evaluation, and Referral	2
PSYCH 45A	Beginning Field Practicum	2
PSYCH 46	Individual Counseling in Human Service Programs	3

Second Semester

PSYCH 40	Case Management and Treatment Planning	3
PSYCH 45B	Intermediate Field Practicum	2
PSYCH 47	Group Counseling in Human Service Programs	3
PSYCH 48	Family Counseling in Human Service Programs	2

Third Semester

PSYCH 24	Psychology of Aging	3
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Fourth Semester

PSYCH 57	Introduction to Gerontology Counseling	3
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**Additional Requirement**

ENG 1A	Written Communications	3
<b>OR</b>		
ENG 79	Preparatory English	5

## HUMAN SERVICES WORKER CERTIFICATE

### Substance Abuse Specialist

**Total Units Required 32 - 34**

**Recommended Sequence:**

First Semester

PSYCH 1	Introduction to Psychology	3
PSYCH 38	Counseling Skills for Human Service Workers	3
PSYCH 39	Client Interview, Evaluation, and Referral	2
PSYCH 45A	Beginning Field Practicum	2
PSYCH 46	Individual Counseling in Human Service Programs	3

Second Semester

PSYCH 40	Case Management and Treatment Planning	3
PSYCH 45B	Intermediate Field Practicum	2
PSYCH 47	Group Counseling in Human Service Programs	3
PSYCH 48	Family Counseling in Human Service Programs	2

Third Semester

PSYCH 52	Introduction to Substance Abuse Counseling	3
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Fourth Semester

PSYCH 53	Drugs and Society	3
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**Additional Requirement**

ENG 1A	Written Communications	3
OR		
ENG 79	Preparatory English	5

## RECREATION ASSISTANT CERTIFICATE

**Total Units Required 27**

**Recommended Sequence:**

First Semester

GUID 10	Introduction to College	0.5
H ED 28	Community Health	2
P E 46	Recreational Leadership	3
ELECTIVE	Physical Education Activity Course	2

Second Semester

H ED 30	Community First-Aid & Safety	2
P E 43	Rules & Officiating	2
ELECTIVE	Physical Education Activity Course	2

Third Semester

P E 1A	Beginning Swimming	1.5
P E 49	Psychology of Sports	3
ELECTIVE	Physical Education Activity Course	2

Fourth Semester

H ED 1	Health Education	3
P E 2	Lifeguard Training	2
ELECTIVE	Physical Education Activity Course	2

## ELECTRICAL TECHNOLOGY CERTIFICATE

**Total Units Required 42 - 44**

**Required Courses**

ELEC 30	Fundamentals of Electricity	5
ELEC 31	Electrical Wiring	7
ELEC 32	Electrical Motor & Controls	5
ELEC 33	Industrial Wiring	5
ELEC 34	Advanced Motor and Control	5
INDUS 45	Industrial Technology	5
<b>OR</b>		
PHYSC 10	Introduction to Physics	4
MATH 80	Elementary Algebra	4
INDUS 31	Industrial Fluids	3
<b>OR</b>		
MECH 15	Machine Shop	4

## ELECTRONICS TECHNOLOGY CERTIFICATE

**Total Units Required 31.5 - 32.5**

**Required Courses**

ELECT 11	AC and DC Network Analysis	4.5
ELECT 12	Solid State Devices	6.5
ELECT 13A	Integrated Circuits	4.5
ELECT 14A	Electronics Troubleshooting	3
ELECT 14B	Advanced Electronics Troubleshooting	3
ELECT 14C	Troubleshooting Computer	3
ELECT 16	Introduction to Microprocessors	4
ELECT 79	Electronics Mathematics	3
<b>OR</b>		
MATH 80	Elementary Algebra	4

## HEATING AND AIR CONDITIONING CERTIFICATE

**Total Units Required 48**

**Recommended Sequence:**

First Semester

MECH 30A	Refrigeration	4
MECH 32A	Air Conditioning Control Circuit Analysis	3
MECH 60	Metal Trade Layout/Forming	5

Second Semester

MECH 31A	Basic Air Conditioning	6
MECH 30B	Refrigeration	4
ELEC 30	Fundamentals of Electricity	5

Third Semester

MECH 31B	Basic Air Conditioning: Troubleshooting	6
MECH 32B	Refrigeration Control Circuit Analysis	3
INDUS 76	Tools and Measurement	3

Fourth Semester

MECH 31C	Heat Pumps and Air Conditioning Systems	6
INDUS 94	Industrial Mathematics	3

## INDUSTRIAL TECHNOLOGY CERTIFICATE

**Total Units Required 36 - 42**

**Required Courses**

MECH 15	Machine Tool Process	4
MECH 10	Metallurgical Technology and Welding	4
<b>OR</b>		
MECH 11A	Basic Welding for the Trades	2
<b>AND</b>		
MECH 11B	Welding for the Trades	2
INDUS 31	Hydraulics and Pneumatics	4
MECH 30A	Refrigeration and Air Conditioning	4
ENGR 73	Trade Drafting	3
MECH 40	Industrial Mechanics	3
ELEC 30	Fundamentals of Electricity	5
<b>OR</b>		
ELECT 11	AC and DC Network Analysis	5
MATH 80	Elementary Algebra	4
<b>OR</b>		
INDUS 94	Industrial Mathematics	3
•ELECTIVES	See Group 1	6 - 11

**•Group 1 (Electives)**

(two courses from the following)

ELEC 35	Commercial Electrical Wiring	4
INDUS 20	Industrial Safety and Health	3
INDUS 41	Instrumentation and Process Control	3
MECH 31A	Basic Air Conditioning: Circuits & Components	6
MECH 32A	Air Conditioning Control Circuit Analysis	3
MECH 60	Metal Trade Layout and Forming	5

## MACHINE SHOP TECHNOLOGY CERTIFICATE

**Total Units Required 48**

**Recommended Sequence:**

First Semester

MECH 50A	Introductory Machine Shop	8
ENGR 73	Trade Technician Drafting Skills	3
INDUS 45	Industrial Technology	5
<b>OR</b>		
ELEC 30	Fundamentals of Electricity	5

Second Semester

MECH 50B	Beginning Machine Shop	8
E TECH 12	Computer-Aided Drafting	3
MECH 60	Metal Trade Layout and Forming	5

Third Semester

MECH 50C	Intermediate Machine Shop	8
MECH 10	Metallurgical Technology and Welding	4
INDUS 31	Hydraulics and Pneumatics	4
<b>OR</b>		
INDUS 35	Mobile Hydraulics	4

## PRINTING TECHNOLOGY CERTIFICATE

**Total Units Required 30.5 - 32.5**

**Required Courses**

•BIM 1A	Beginning Keyboarding	1.5
PRINT 51A	Introduction to Graphic Communication	5
PRINT 60	Introduction to Graphic Production	5
ENG 1A	Written Communications	3
<b>OR</b>		
ENG 79	Preparatory English	5
••PRINT	See Group 1	
<b>ELECTIVES</b>		
•••ELECTIVES	See Group 2	6

**•or a typing certificate for 25 words per minute or better**

**••Group 1 (Print Electives)**

(minimum of 10 units from the following)

PRINT 51B	Beginning Graphic Communications	5
PRINT 61	Creative Services	5
PRINT 62	Pre-Press	5
PRINT 63	Press and Finishing	5
PRINT 82A	Metropolitan Newspaper Production	5
PRINT 82B	Advanced Metropolitan Newspaper Production	5
PRINT 83A	Applied Graphic Arts	5
PRINT 83B	Applied Graphic Arts	5
PRINT 84A	Offset Presswork	5
PRINT 84B	Offset Presswork	5
PRINT 87A	Printing Specialization	5
PRINT 87B	Printing Specialization	5

**•••Group 2 (Electives)**

(minimum of 6 units from the following)

ART 4	Exploring Art	3
ART 6	Color and Design	3
BUS 23	Advertising	3
INDUS 76	Tools and Measurements	3
PHOTO 1A	Introduction to Photography	3
C S 18B	Microcomputers and Small Business: Apple Macintosh	3
BIM 23A	Beginning Desktop Publishing Using PageMaker	3

## REFRIGERATION CERTIFICATE

**Total Units Required 36**

**Recommended Sequence:**

First Semester

MECH 30A	Refrigeration	4
MECH 32A	Air Conditioning Control Circuit Analysis	3
MECH 60	Metal Trade Layout/Forming	5

Second Semester

MECH 31A	Basic Air Conditioning	6
MECH 30B	Refrigeration	4
ELEC 30	Fundamentals of Electricity	5

Third Semester

MECH 31B	Basic Air Conditioning: Troubleshooting	6
MECH 32B	Refrigeration Control Circuit Analysis	3

## WELDING TECHNOLOGY CERTIFICATE

**Total Units Required 48 - 49**

**Required Courses**

MECH 88A	Introductory Trade Welding	8
MECH 88B	Trade Welding	8
MECH 88C	Trade Welding	8
ENGR 73	Trade Technician Drafting Skills	3
INDUS 35	Mobile Hydraulics	4
MECH 15	Machine Tool Processes	4
MECH 60	Metal Trades Layout and Forming	5
ELEC 30	Fundamentals of Electricity	5

**OR**

INDUS 45	Industrial Technology	5
INDUS 94	Industrial Mathematics	3

**OR**

MATH 80	Elementary Algebra	4
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