

Accounting

Program Code 101011

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5435. Toll free: (800) 422-NWTC. Offered part-time at the Marinette campus.

PROGRAM DESCRIPTION

Accounting prepares students for entry-level positions as accountants. Accountants work with accounting systems, analyze business records, prepare financial reports, and supervise bookkeepers.

Graduates of this program will be able to:

- Manage general ledger.
- Manage accounts receivable.
- Manage accounts payable.
- Maintain inventory control.
- Prepare payroll.
- Prepare income taxes.
- Account for fixed assets.
- Perform job order cost accounting.
- Perform process cost accounting.
- Perform standard cost accounting.
- Analyze financial statements.
- Prepare budgets.
- Manage cash flows.
- Use corporate accounting procedures.
- Analyze accounting information to make appropriate decisions.
- Perform reconciliation procedures.
- Create spreadsheets.
- Perform accounting functions using computerized accounting packages.
- Demonstrate proficiency in math using table top calculator and T.I. Business Analyst.
- Perform activity-based costing.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- Basic math (algebra recommended)
- Ability to use computer keyboard

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as Accounts Payable/Receivable Accountant, Payroll Accountant, Inventory Control Accountant, Cost Accountant, Public Accountant, Accountant, Tax Accountant, and Governmental/Nonprofit Accountant.

ACCOUNTS PAYABLE/RECEIVABLE

ACCOUNTANT: records and pays bills of the company, records receivables transactions, bills customers at regular intervals, records charges and payments.

PAYROLL ACCOUNTANT: handles the payroll for a business, end-of-period reports; time cards; computes overtime, deducts taxes, and prepares payroll checks; and reconciles payroll accounts.

INVENTORY CONTROL ACCOUNTANT: records receipt and dispersal of goods using a perpetual inventory system, assigns costs using an inventory valuation method.

COST ACCOUNTANT: determines cost of products manufactured; determines variations from standards in labor, materials, and overhead; prepares budgets; and prepares various management reports.

PUBLIC ACCOUNTANT: keeps records for small business; prepares payroll records; prepares financial records, income statements, and balance sheets.

ACCOUNTANT: keeps financial records, prepares financial records (income statements, balance sheets, budgets, and summary reports), and analyzes accounts.

TAX ACCOUNTANT: prepares tax returns for both state and federal governments, assists in tax planning and tax shelters, and files payroll reports and quarterly reports as required by government agencies.

GOVERNMENTAL/NONPROFIT ACCOUNTANT: keeps records of governmental/nonprofit agencies using the fund method of accounting.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Auditor
- Certified Public Accountant
- Comptroller
- Treasurer
- Trust Officer

CURRICULUM

The Accounting Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 69 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-101-110	Accounting 1	4
10-102-101	Financial Applications	3
10-103-103	Micro Basics MS Office 1	3
10-801-195	Communication-Written	3
10-804-101	Math-Business	3
SEMESTER TOTAL		16

SECOND SEMESTER

10-101-105	Accounting-Computer Ledger	2
10-101-120	Accounting 2	4
10-101-151	Accounting-Payroll	3
10-102-150	Law-Business	3
10-801-196	Oral/Interpers Communication	3
10-809-199	Psychology-Human Rel	3
SEMESTER TOTAL		18

THIRD SEMESTER

10-101-131	Accounting-Intermediate	4
10-101-134	Accounting-Cost	4
10-101-154	Accounting-Personal Tax	4
10-104-108	Credit Procedures	3
	Elective	3
SEMESTER TOTAL		18

FOURTH SEMESTER

10-101-142	Accounting-Managerial	3
10-101-143	Accounting-Govern/Nonprofit	2
10-101-156	Accounting-Auto Appl	3
10-809-195	Economics	3
10-809-197	Society-Amer Contemp	3
	Elective	3
SEMESTER TOTAL		17

SUGGESTED ELECTIVES: Micro Basics MS Office 2 (10-103-109), Financial Management-Medical (10-101-145), Financial Statement Analysis (10-102-172)

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-101-110 ACCOUNTING 1 ...accounting principles, financial statements, business transactions, accounting cycles/systems, specialized journals, accounting for cash, receivables, and temporary investments, inventories, fixed assets, payroll, notes payable, current liabilities, sole proprietorships, and partnerships.

10-101-120 ACCOUNTING 2 ...concepts and principles covering corporations, capital stocks, dividends, bonds, amortization of bond premiums, and discounts; manufacturing, job order and process cost systems; variances; managerial application including decision making and financial analysis. (Prerequisite: 10-101-110, Accounting 1)

10-101-131 ACCOUNTING-INTERMEDIATE ...understand income statements, balance sheets, cash flow statements, cash and receivables, inventories and cost of goods sold, noncurrent operating assets, earnings per share, accounting changes and corrections, financial statement analysis. (Prerequisite: 10-101-120, Accounting 2)

10-101-134 ACCOUNTING-COST ...contemporary cost environments and issues; selecting, analyzing, and tracking costs; production costing methods: job order, process, standard costs, by-product, and joint costing. Requires experience with Windows, and prior completion of an introductory course in Word, and introductory and intermediate courses in Excel. (Prerequisite: 10-101-120, Accounting 2)

10-101-142 ACCOUNTING-MANAGERIAL ...cost behavioral patterns, cost-volume-profit relationships, segment reporting, profit planning, budgets and overhead analysis, decentralized operations, pricing decisions, capital investment decisions, and service department costing. (Prerequisite: 10-101-134, Accounting-Cost)

10-101-143 ACCOUNTING-GOVERNMENTAL & NONPROFIT ...use fundamental knowledge for understanding the operation of governmental and nonprofit entities, their accounting, auditing, and financial reporting practices and the standards that shape their accounting and financial reporting systems. (Prerequisite: 10-101-120, Accounting 2)

10-101-151 ACCOUNTING-PAYROLL ...payroll and personnel records, social security, withholding tax, unemployment compensation, time sheets and time-keeping records, and legal aspects of payroll. (Prerequisite: 10-101-110, Accounting 1)

10-101-154 ACCOUNTING-PERSONAL TAX ...history and research of tax law and regulations; preparation of Federal individual income taxes including forms 1040, 1040A, and 1040EZ, and supporting schedules and forms.

10-101-156 ACCOUNTING-AUTOMATED APPLICATIONS ...Window commands, file management, worksheet applications, database applications, macros, evaluation of accounting software, installation of software, and conversion of manual accounting system to a computerized system. Requires experience with Windows, and prior completion of an introductory course in Word, and introductory and intermediate courses in Excel. (Prerequisite: 10-101-120, Accounting 2)

10-103-103 MICRO BASICS MS OFFICE 1 ...introductory computer software packages and applications, basics of operating a computer, Windows concepts, mouse techniques, word processing using Word, creating spreadsheets and charts using Excel.

Descriptions of courses not found on this page can be found in the back of the catalog.

Administrative Assistant Program Code 101066

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay and Marinette campuses. Information in Green Bay: (920) 498-5733. Information in Marinette: (715) 735-9361. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Administrative Assistant prepares students to be efficient and effective office employees through application of office procedures (proofreading, telephone, records management, meeting and travel arrangements, project management, Internet research, etc.) and software skills (word processing, desktop publishing, spreadsheet, presentation graphics, electronic calendaring, and database). All software materials prepare students to sit for the Microsoft Office User Specialist (MOUS) exams.

Graduates of this program will be able to:

- Provide customer service.
- Manage information.
- Maintain financial records.
- Create publications/presentations.
- Maintain equipment.
- Arrange travel.
- Process documents.
- Coordinate meeting activities.
- Process mail.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- Basic math
- A keyboarding skill of 20 WPM using the TOUCH method is recommended.

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as Administrative Assistant, Legal Administrative Assistant, Medical Administrative Assistant, Office Assistant, Receptionist/Administrative Assistant, Transcriptionist, or Word Processor.

ADMINISTRATIVE ASSISTANT: schedules appointments; communicates effectively in person, on the phone, and in writing; transcribes dictation from notes or machines; prepares agendas; takes minutes; arranges itineraries; schedules travel plans; handles mail; uses word processing, spreadsheet, presentation graphics, and/or database software; and possibly supervises others.

LEGAL ADMINISTRATIVE ASSISTANT: performs all duties of an administrative assistant in a legal office specializing in legal formats, terminology, and procedures.

MEDICAL ADMINISTRATIVE ASSISTANT: performs all duties of an administrative assistant in a medical facility specializing in medical procedures and terminology.

OFFICE ASSISTANT: types, files, transcribes, does word processing, works with the telephone, makes appointments, keeps records, sets up meetings, and handles customer relations.

RECEPTIONIST/ADMINISTRATIVE ASSISTANT: receives and routes telephone calls, greets visitors, handles filing, mail, photocopying, and faxing; may provide administrative support at various levels within the organization.

TRANSCRIPTIONIST: uses transcribing machines and word processing equipment, proofreads, and verifies documents.

WORD PROCESSOR: works in a specialized department of a company producing all forms of documents for the firm; edits, revises, proofreads; and types with speed and accuracy using word processing software.

With additional education and/or work experience, a graduate may find employment in a variety of specialties.

- Certified Professional Secretary (CPS)
- Executive Assistant/Secretary
- Office Manager
- Records Analyst
- Instructor/Trainer
- Event Coordinator
- Team Leader

CURRICULUM

The Administrative Assistant Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 68 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-103-151	Micro: PowerPoint-Intro	1
10-106-103	Info Process Principles	3
10-106-106	Keyboard-Skills	2
	OR	
10-106-107	Keyboard-Speed/Accuracy 1	1
	AND	
10-106-112	Keyboard-Speed/Accuracy 2	1
10-106-131	Transcription Fund 1	3
10-106-138	Software Skills 1	3
	OR	
10-103-111	Micro: Windows-Introduction	1
	AND	
10-103-121	Micro: Word-Introduction	1
	AND	
10-103-122	Micro: Word-Part 2	1
10-106-153	Professional Profile	3
10-804-101	Math-Business	3
	SEMESTER TOTAL	18

SECOND SEMESTER

10-103-160	Micro: Outlook	1
10-106-113	Keyboard-Speed/Accuracy 3	1
10-106-126	Admin Office Procedures 1	2
10-106-132	Transcription Fund 2	2
10-106-139	Software Skills 2	2
	OR	
10-103-131	Micro: Excel-Introduction	1
	AND	
10-103-132	Micro: Excel-Part 2	1
10-106-142	Software Projects	3
10-106-152	Records Management	2
10-106-172	Telephone Skills	1
10-801-195	Communication-Written	3
	SEMESTER TOTAL	17

THIRD SEMESTER

10-101-101	Accounting Principles	3
10-106-136	Admin Office Procedures 2	3
10-106-140	Software Skills 3	3
	OR	
10-103-123	Micro: Word 3-Advanced	1
	AND	
10-103-141	Micro: Access-Intro	1
	AND	
10-103-142	Micro: Access-Part 2	1
10-809-197	Society-Amer Contemp	3
10-809-199	Psychology-Human Rel	3
	Elective	3
	SEMESTER TOTAL	18

FOURTH SEMESTER

10-106-144	Administrative Asst Intern	3
10-106-161	Integrated Projects	3
10-801-197	Reporting-Technical	3
10-809-195	Economics	3
	Elective	3
	SEMESTER TOTAL	15

SUGGESTED ELECTIVES: Office Politics (10-106-157), Meetings-Organizing (10-106-171), WorkSkills (10-196-102), Project Change Management 1-MS Project (10-107-151), Micro: Access-Part 3 (10-103-143)

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-103-111 MICRO: WINDOWS-INTRODUCTION

...Windows desktop elements, help features, document management (create, open, save, print), folder and file management (create, delete, move, find file), Web features, search strategies, shortcuts, screen capture, My Computer/Explorer.

10-103-121 MICRO: WORD-INTRODUCTION

...word processing basics including creating, revising, formatting, and printing; sections, tabs, multiple-page numbering; manipulating text; and creating headers and footers. Requires Windows experience.

10-103-122 MICRO: WORD-PART 2 ...advanced word processing features including merge, columns, tables, templates, styles, borders and clip art, Microsoft draw and WordArt, footnotes and endnotes, and creating a Web page. Requires strong introductory Word skills.

10-103-123 MICRO: WORD-PART 3

...hyphenation, charts, macros, styles, sort/select, outlines, fill-in forms, table of contents, and index. Requires intermediate Word skills.

10-103-131 MICRO: EXCEL-INTRODUCTION

...creating a worksheet, enhancing worksheet appearance, moving and copying data, using formulas and functions, creating charts and using clip art. Requires Windows experience.

10-103-132 MICRO: EXCEL-PART 2 ... advanced formatting techniques and functions, working with templates, collaborating with multiple Excel users, Excel's database features and analysis tools. Requires prior completion of Excel Intro.

10-103-141 MICRO: ACCESS-INTRODUCTION ...database tables, relationships, queries, calculations, aggregate functions, form and report wizards, and compacting. Requires Windows experience.

10-103-142 MICRO: ACCESS-PART 2 ...lookup wizards, parameter queries, custom forms, multi-page forms with tab controls, filters, custom reports with grouping and calculations, data access pages, embedding charts, and hyperlinks. Requires strong introductory Access skills.

10-103-151 MICRO: POWERPOINT-INTRODUCTION ...prepare overheads, handouts, and slide shows using Wizards, templates, Word Art, animations, transitions, and hyperlinks. Requires Windows experience.

10-103-160 MICRO: OUTLOOK ...use email, personal distribution list, signature, attachments, and task list; schedule appointments using calendar; flag, filter, sort, and merge contacts, add voting buttons, delivery receipts, and delivery dates to messages.

10-106-103 INFORMATION PROCESSING PRINCIPLES ...information processing cycle and workflow, terminology, hardware, software, ergonomics, security, systems, Internet, and career opportunities.

10-106-106 KEYBOARD-SKILLS ...skill development on the alphabetic keyboard including top-row number keys, and ten-key pad using analytic/diagnostic software in a structured classroom setting. Minimum alphabetic speed developed is 40 WPM. Requires touch keyboarding at 20 WPM.

10-106-107 KEYBOARD-SPEED/ACCURACY 1 ...skill development on the alphabetic keyboard using analytic/diagnostic software. Minimum alphabetic speed developed is 35 WPM in a 3-minute timing. Requires ability to touch keyboard at 20 WPM.

10-106-112 KEYBOARD-SPEED/ACCURACY 2 ...skill development on the alphabetic keyboard, top-row number keys, and ten-key pad using analytic/diagnostic software. Minimum alphabetic speed developed is 40 WPM. Requires touch keyboarding at 35 WPM.

10-106-113 KEYBOARD-SPEED/ACCURACY 3 ...skill development on the alphabetic keyboard pad using analytic/diagnostic software. Minimum alphabetic keyboard speed to be developed is 45 WPM. Requires ability to touch keyboard at 40 WPM.

10-106-126 ADMINISTRATIVE OFFICE PROCEDURES 1 ...today's global business environment, including decision making, working in a team, time management, virtual office, meetings, reprographics, processing mail, and machine transcription. Requires Windows, intermediate Word, and PowerPoint experience.

10-106-136 ADMINISTRATIVE OFFICE PROCEDURES 2 ...today's global business environment including ethics, information research, presentation skills, travel/conference planning, financial responsibilities, employment and advancement, leadership and management, and machine dictation and transcription.

10-106-138 SOFTWARE SKILLS 1 ...basic Windows 2000 features and Word 2002 features including creating, revising, printing, headers/footers, sections, tables, charts, columns, merging, draw and WordArt. Requires ability to touch keyboard at 20 WPM.

10-106-139 SOFTWARE SKILLS 2 ...basic and advanced spreadsheet concepts using Excel 2002: creating/printing worksheets, formulas, functions, working with multiple worksheets, linking files, charts/graphs, data lists, analysis tools.

10-106-140 SOFTWARE SKILLS 3 ...basic Windows 2000 features and Word 2002 features including creating, revising, printing, headers/footers, sections, tables, columns, charts, merging, draw, and WordArt. Requires ability to touch keyboard at 20 wpm.

10-106-142 SOFTWARE PROJECTS ...applying Windows 2000 and Word 2002 features to manage and format business documents while exercising decision-making skills and enhancing keyboarding in a team setting. Requires Windows and intermediate Word background.

10-106-144 ADMINISTRATIVE ASSISTANT INTERNSHIP ...employment with supervision of business employer and instructor; 144 work hours and 17 class hours with related projects, reports, and discussions. Recommended for graduating semester.

10-106-152 RECORDS MANAGEMENT ...major systems of classification: alphabetic, numeric, geographic, subject, chronologic, and micro systems; retention and disposition of records; records equipment and technology.

10-106-153 PROFESSIONAL PROFILE ...workplace attributes such as attitude, goal setting, habits, and techniques for success and promotion; leadership and organizational skills; and diversity in the workplace.

10-106-161 INTEGRATED PROJECTS ...integration of Word, Excel, PowerPoint, and Access in projects, finalize portfolio, manage PDAs, and certification practice tests. Requires prior completion of intermediate courses in Excel and Access and advanced Word.

10-106-172 TELEPHONE SKILLS ...using the telephone effectively and efficiently in the world of work; telephone features, equipment, messaging, cellular technology, pagers, electronic, and voice mail.

Descriptions of courses not found on this page can be found in the back of the catalog.

Applied Engineering Technology Program Code 106237

ASSOCIATE DEGREE

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

This program is designed to prepare technicians and team members to work in the manufacturing industry sector. In today's competitive environment, there is a need for specialized training in a variety of manufacturing areas. Numerous participants of our workshop and seminar series have also expressed the desire for additional knowledge in the seminar topic areas with which they had become acquainted, and preferred to have that additional instruction become a part of a recognized NWTC program or certificate. This new AET program is a part of a new statewide program.

The program provides students with a core background in general manufacturing sciences. The learner selects an area of specialization.

The core curriculum introduces students to:

- Manufacturing Materials, Processes and Practices.
- Quality Assurance.
- Quality Systems.
- Statistical Process Control.
- Materials Resource Planning.
- Standards and Regulations.
- Precision Measuring.
- Problem Solving Techniques.
- Blueprint Reading.

Areas of specialization include:

- Quality Assurance Technician.
- Industrial/Manufacturing Engineering Technician.
- Safety Technician.

Occupational support, general education and elective courses support this occupational curriculum so that a learner can earn an Associate of Applied Science degree.

The program will incorporate a variety of delivery approaches intended to increase learner access to degree programs. The core curriculum and most of the specialized courses will be offered in both traditional classroom format and in an individualized learning format.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Equivalency may be established through GED testing or other tests.)

MATH LEVEL

High school algebra or equivalent. For a description of algebra skills, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the Applied Engineering Technology Program with a specialization in Quality Assurance Technician will have the potential for employment as a Quality Technician, and with additional education and/or work experience as a Quality Control Supervisor, a Quality Assurance Manager or and ASQC Certified Quality Engineer. The Quality Technician specialty is designed to address the background needed to sit for certification examinations offered by the American Society for Quality for inspectors, auditors, and technicians.

A graduate with specialization in Industrial/Manufacturing Engineering Technician will have the potential for employment as an Industrial Engineering Technician, Manufacturing Engineering Technician, Standard Engineering Technician and Productivity Improvement Technician. It will also provide skill training for members of Continuous Improvement Teams to increase the likelihood of success for their improvement projects. Individual courses will serve as significant choices as electives for other NWTC associate degree programs.

A graduate with a specialization in Safety Technician will be able to contribute to a safety and health program in any size organization. This specialization is ideal for preparing you to work with supervisors and employees to ensure a safe and healthy work environment. Large organizations utilize safety technicians to work on the floor with employees and supervisors. Small organizations may have employee safety responsibilities assigned as an addition to other jobs, and this specialization will prepare you for those hands-on responsibilities.

A graduate with specialization as a Quality Assurance Technician will have skills and knowledge to promote continuous improvement and customer satisfaction through the application of quality concepts, principles and methodologies using the latest scientific approaches.

CURRICULUM

The Applied Engineering Technology program consists of 18 credits of core course material, 15 credits of general education, 12 credits of occupational support courses, 6 credits of electives, and 15 credits of technical specialization. Upon graduation, a student will have completed 66 credits.

CORE COURSES

Course No.	Description	Credits
10-623-108	Manufacturing Materials	1
10-623-111	Manufacturing Processes	2
10-623-106	Interpreting Engineering Drawings	2
10-623-107	Manufacturing Practices	2
10-623-114	Material Resource Planning	2
10-623-100	Standards and Regulations	1
10-623-101	Quality Assurance	1
10-623-105	Precision Measuring	1
10-623-109	Problem Solving	2
10-623-103	Quality Systems	2
10-623-102	Statistical Process Control	2
TOTAL		18

GENERAL EDUCATION

10-801-195	Communication-Written	3
10-801-196	Oral/Interpers Comm	3
10-809-195	Economics	3
10-809-197	Society-Amer Contemp	3
10-809-199	Psychology-Human Rel	3
TOTAL		15

OCCUPATIONAL SUPPORT

10-103-103	Micro Basics MS Office	3
10-804-130	Math-Algebra/Trig	3
10-804-131	Math-Algebra/Inter	3
10-806-150	Physics I-Technical	3
ELECTIVE		6
TOTAL		12

INDUSTRIAL/MANUFACTURING ENGINEERING TECHNICIAN SPECIALIZATION

10-623-121	Work Measurement	3
10-623-161	Facilities Planning	3
10-623-162	Process Improvement	2
10-623-163	Equipment Planning and Justification	2
10-623-164	Ergonomics/Safety	2
10-623-165	Process Planning	3
TOTAL		15

QUALITY ASSURANCE TECHNICIAN SPECIALIZATION

10-623-113	Quality Documentation	3
10-623-115	Cust/Vendor Rel/Audits	3
10-623-116	Inspection	3
10-806-131	Material Science	3
10-623-133	Quality Engineering	3
TOTAL		15

SAFETY TECHNICIAN SPECIALIZATION

10-449-100	Safety Management	3
10-449-101	Regulatory Compliance	3
10-449-102	Accident Investigation	3
10-449-103	Industrial Hygiene-Intro	3
10-449-104	Audits and Inspections	3
TOTAL		15

SUGGESTED ELECTIVES:

10-449-105	Emergency Spill Response	3
10-449-106	Construction Safety	3

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-449-100 SAFETY MANAGEMENT ...this self-paced course provides an overview of occupational health and safety management principles, systems and supporting techniques to initiate and/or improve an organization's safety management system. Included is a focus on job safety analysis and fault tree analysis. From this base knowledge, the student will be able to coordinate safety policies and objectives in an orderly, consistent manner into existing functional areas such as operations, finance, quality and environmental management.

10-449-101 REGULATORY COMPLIANCE ...this self-paced course will provide an overview of occupational safety and health compliance procedures emphasizing areas such as hazard communication, lockout/tagout, confined space entry, personnel protective equipment, machine guarding, hand and portable tools, and fire safety. From this base knowledge, the student will be able to initiate and/or evaluate written compliance programs. The student will be introduced to the potential hazards and regulator compliance issues of chemicals. The student will learn concepts in the management of hazardous material and wastes as well as the essential skills required to serve in the capacity of an environmental professional.

10-449-102 ACCIDENT INVESTIGATION ...in this course you will determine cause, uncover indirect accident causes, prevent similar accidents from occurring, document facts, provide information on costs, and promote safety. In addition, you will learn how to train first line supervisors in the area of accident/incident investigation, and train employees how to report accidents/incidents. OSHA record keeping and corrective action will also be addressed within this course.

10-449-103 INDUSTRIAL HYGIENE-INTRODUCTION ...fault finding, with the emphasis on criticism and fact-finding, with the emphasis on locating potential hazards that can adversely affect safety and health will be analyzed. The course will also evaluate and assess safety and health risks associated with equipment, material, processes and activities.

This self-paced course emphasizes calibrating and operating industrial hygiene related equipment, sampling methods, collecting data, and interpreting results. From this base knowledge, the student will be able to operate industrial hygiene equipment in a manufacturing environment and apply the results to reduce occupational exposures.

10-449-104 AUDITS AND INSPECTIONS ...this course will examine the process that takes place during the planning, design, and operational phases of the safety system. The student will learn how to conduct the monitoring function in an organization to locate and report existing and potential hazards having the capacity to cause accident in the workplace. They will see how to locate and interpret past injury and illness data and compare to current data.

10-623-100 STANDARDS/REGULATIONS ...role of standards and regulations to reduce work place hazards.

10-623-101 QUALITY ASSURANCE-TECHSPAN ...role of quality improvement in modern companies.

10-623-102 SPC-TECHSPAN ...basic concepts and tasks of collecting data, calculating values, and constructing control charts.

10-623-103 QUALITY SYSTEMS-TECHSPAN ...implementation of ISO 9000 standards to a manufacturing company.

10-623-105 PRECISION MEASURE ... you will be introduced to measurement tools and their uses. The course provides hands-on activities using tools, reading prints, and assessing measuring systems.

10-623-106 INTERPRET ENGINEERING DRAWINGS ...reading and interpreting industrial prints.

10-623-107 MANUFACTURING PRACTICES ...practices used by manufacturers to make their operations more competitive, efficient, and cost effective.

10-623-108 MANUFACTURING MATERIALS ...classifications, properties, and applications of the materials used in manufacturing.

10-623-109 MANUFACTURING PROBLEM SOLVING...scientific method of identifying the root cause, common analysis, and change generation techniques for a variety of manufacturing problems.

10-623-111 MANUFACTURING PROCESSES ...primary and secondary processes; tools and tooling. Used in manufacturing, forming and casting techniques, and material removal processes; assembly, finishing, and routing techniques.

10-623-113 QUALITY DOCUMENTATION ...ISO 9000, documentation, writing sampling plans, procedure writing, and customer needs evaluation.

10-623-114 MATERIAL RESOURCE PLANNING...how manufacturers determine their need for resources, how the availability of resources affects capacity, and how resources are allocated.

10-623-115 CUSTOMER/VENDOR RELATIONS/AUDITS ...the quality department's role in customer relations, vendor certification programs, and performing internal and vendor audits.

10-623-116 INSPECTION ...advanced metrology and introduction to non-destructive examination.

10-623-121 WORK MEASUREMENT ...the learner will develop skills in designing workstations, developing better work methods, establishing work standards, balancing assembly lines, and estimating labor costs. The time study techniques to be used include predetermined time standard system, stopwatch, and work sampling.

10-623-133 QUALITY ENGINEERING ...planning for quality, quality of design, reliability, manufacture planning, and design of experiments.

10-623-161 FACILITIES PLANNING ...this course will provide the student a practical means to use data to develop and improve plant and facility layouts and improve material handling methods that will yield higher production, lower costs, and/or improve quality and customer service.

10-623-162 PROCESS IMPROVEMENT ...this course will provide the student with the skills to go through the process from identifying cost reduction opportunities through installing the improved methods with the use of process improvement tools.

10-623-163 EQUIPMENT JUSTIFICATION ...student will develop the skills to collect data and prepare justification, assist in new equipment selection, installation, support and monitoring, and monitor equipment's preventive maintenance program.

10-623-164 ERGONOMICS/WORKPLACE SAFETY ...student will be able to identify, analyze, and recommend improvements to work areas minimizing work place injuries. Exposure to: ergonomic guidelines, cost analysis, benefits of ergonomic improvements, and accident investigation.

10-623-165 PROCESS PLANNING ...instruction provides the student with the skills to take a new product from the design stage to production while meeting the product and quality specifications, and cost target requirements by determining production sequence, specifying required tools and equipment, and scheduling manpower and machinery in order to meet production dates.

10-806-131 MATERIALS SCIENCE ...classification and identification; mechanical properties; microscopic and spectrographic analysis of materials; heat treatment procedures of hardening, tempering, and annealing; surface treatment of steels; and effects of alloys on metals.

Descriptions of courses not found on this page can be found in the back of the catalog.

Apprenticeship

OFFERED AT THE GREEN BAY, MARINETTE, AND STURGEON BAY CAMPUSES

Course information: Green Bay - (920) 498-5682, Marinette campus - (715) 735-9361, or Sturgeon Bay campus - (920) 743-2207. Toll free: (800) 422-NWTC.

WHAT IS APPRENTICESHIP?

It is an earn-while-you-learn program of on-the-job training combined with related classroom instruction that is normally provided by the district technical college.

As an apprentice, students are trained under a written training agreement called an indenture. While indentured, the employer agrees to teach the student the skills of the trade and the apprentice agrees to learn the skills involved. Other conditions of the indenture, such as the length of training, amount of pay, the rate of periodic pay increases, and the related classroom hours are covered. An apprenticeship is one of the best ways to enter a skilled occupation.

WHAT IS INVOLVED?

An indentured apprentice works a regular workweek, is paid apprentice wages, and also attends paid related instruction on a regularly scheduled basis. The apprentice's progress in both the on-the-job training and classroom instruction is evaluated and appropriate records are maintained.

There is no discrimination in any phase of apprenticeship employment and training.

Upon completion of the training program, apprentices will receive a certificate from the state of Wisconsin certifying each one as a completed apprentice. To protect the interests of all parties concerned and to assist in the enforcement of the various aspects of the agreement, the Wisconsin Department of Workforce Development, Bureau of Apprenticeship Standards, is given the responsibility of overall supervision of the apprenticeship program.

Apprenticeship is not an on-demand program. All applicants must apply to the programs through the respective committee or sponsor. The Apprenticeship Office at NWTC can assist with the application process. Contact the Apprenticeship office at: (920) 498-5682, or check out our Web site at: www.nwtc.edu [Apprenticeship].

WHAT ARE THE QUALIFICATIONS FOR AN APPLICANT?

The basic requirement is that the applicant be at least 16 years of age. In ALL cases, however, the applicant is also required to be a high school graduate or to have passed the high school equivalency test. Applicants are also required to take the Accuplacer test which is provided at Northeast Wisconsin Technical College or other trade specific exam by committee.

Most employers and/or joint apprenticeship committees have approved selection standards with more exacting requirements. In some trades, the requirements for the applicant include one or two years of high school math. Some trades require that the applicant take an aptitude test.

HOW LONG DOES IT TAKE?

The length of the apprenticeship depends upon the skilled occupation involved. Apprentice programs vary from two to five years. The average program is four years in length.

WHAT RELATED CLASSROOM INSTRUCTION IS INVOLVED?

The number of classroom hours range from 288 hours to 1,008 hours of paid related instruction, depending upon the skilled occupation, with the average being 400 hours. This related instruction teaches the apprentice the theory behind the skills learned on the job. Apprentices are required to attend night school on their own time and at their own expense.

WHERE IS THE RELATED TRAINING OFFERED?

The Clayton J. Smits Apprenticeship Center of Northeast Wisconsin Technical College offers related classroom instruction at the Green Bay, Marinette, and Sturgeon Bay campuses.

WHAT IS AN APPRENTICEABLE OCCUPATION?

An apprenticeable occupation is clearly identified and commonly recognized throughout an industry. It involves manual, mechanical, or technical skills and knowledge that require a minimum of 2000 hours of on-the-job work experience. It also requires an average of 400 hours of paid related classroom instruction to supplement the on-the-job training. The state of Wisconsin has recognized more than 300 apprenticeable occupations. Some of the occupations served by the Clayton J. Smits Apprenticeship Center of NWTC are:

Adjuster/Finisher
Cabinetmaker
Carpenter
Electrician
Construction Electrician
Industrial Electrician
Residential Electrician
Voice Data Video Technician
Electrical/Instrumentation
Foundry
Instrumentation
Machinist
Regular Machinist
Maintenance Machinist
Tool & Die
Mason
Bricklayer
Block Layer
Cement Finisher
Plasterer
Tile Setter
Machine Repair
Mechanical Adjuster
Maintenance Mechanic (Millwright)
Construction Maintenance Mechanic
Industrial Maintenance Mechanic
Industrial Pipefitter
Plumber
Resilient Floor
Sheet Metal
Steamfitter
ABC HVAC

HOW DO I START?

Start by learning what you can about the skilled occupation in which you are interested. Talk to people who are in the occupation, both employers and employees, counselors at your high school, or the local technical college, employers' associations, and labor unions. Remember, looking for an apprenticeship is like looking for a job. Applications should be made directly with employers or joint apprenticeship committees.

If you are entering an occupation that involves action by a joint apprenticeship committee, it will be necessary for you to go through their selection and interview procedures. Very often a committee may maintain a waiting list of qualified applicants who passed the committee's selection procedures.

WHAT IS AN APPRENTICESHIP EMPLOYER?

An employer must be an individual, a joint apprenticeship committee, an owner of a business, a company, or a corporation who can teach the skills involved in the occupation. All sponsors of indentured apprentices are equal opportunity employers.

WHAT ARE APPRENTICE WAGES?

Wages in the various skilled occupations and localities vary; most apprentices start at approximately 50% of the current skilled rate.

The apprentice is on a progressive wage scale with increases every six months, so that during the program the apprentice will average 60% of the skilled rate.

HOW DO I GET MORE INFORMATION?

For more information about a specific skilled occupation, contact:

Bureau of Apprenticeship Standards
2740 W. Mason Street
P.O. Box 19042
Green Bay, WI 54307-9042
(920) 492-5618

Apprenticeship Coordinator,
Trades & Technical Division
Northeast Wisconsin Technical College
2740 W. Mason Street
P.O. Box 19042
Green Bay, WI 54307-9042
(920) 498-5704
(800) 422-NWTC, Ext. 5704



Descriptions of courses not found on this page can be found in the back of the catalog.

Architectural Technology

Program Code 106141

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Architectural Technology prepares students to work in residential design, for architects, engineers, or material manufacturers, to produce drawings for wood, steel, masonry, and reinforced concrete structures.

Graduates of the Architectural Technology Program will be able to:

- Develop architectural working drawings for commercial buildings using steel, concrete, and masonry.
- Develop residential working drawings to meet code and client criteria.
- Perform technical designs/calculations and produce drawings for electrical, plumbing, and heating/ventilating systems.
- Produce drawings and details for structural wood, steel, and concrete members and connections.
- Explain the design and construction process.
- Solve problems creatively and critically.
- Communicate architectural facts and ideas orally and in writing.
- Communicate graphic architectural ideas utilizing sketching techniques.
- Work as a team to produce group projects.
- Exercise a proper work ethic.
- Display a positive attitude toward their profession.
- Apply codes, manufacturers' standards, tables, and technical manuals in design and drafting of a structure.
- Apply mathematical principles and formulas and explain structural load tables as applied to building construction.
- Coordinate building specifications with working drawings.
- Choose appropriate materials for use in building construction.
- Estimate the materials required to construct a residential building.
- Operate computer drafting hardware and software to produce architectural working drawings.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Those who do not complete high school may establish their equivalency through GED testing or other entrance tests.)
- High school background in mathematics, science, and industrial education and/or construction related experience
- High school algebra or equivalent

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as an Architectural Technician, Building Materials Sales Person, Building Mechanical Technician, Shop Drawing Draftsperson, Structural Draftsperson, Residential Designer, as well as many other construction related positions.

ARCHITECTURAL TECHNICIAN: works under the direction and supervision of an architect or professional engineer preparing working drawings for residential, commercial, industrial, or similar buildings.

BUILDING MATERIALS SALES PERSON: works in retail sales of building products in a building materials center or similar establishment.

BUILDING MECHANICAL TECHNICIAN: works under the direction and supervision of an architect or professional engineer preparing working drawings on a conventional drafting or CAD system for heating, plumbing, and electrical systems within a building.

SHOP DRAWING DRAFTPERSON: works under the supervision of a professional engineer, developing fabrication and erection drawings for components used in construction.

STRUCTURAL DRAFTSPERSON: works under the direction and supervision of an architect or fabricator/professional engineer preparing working drawings on a conventional drafting or CAD system for steel, concrete, and wood building systems.

RESIDENTIAL DESIGNER: works independently designing and drafting homes for building materials centers or residential contractors.

With additional education and/or work experience, a graduate may find other opportunities for employment.

- Architect
- Building Inspector
- Senior Draftsperson
- Commercial or Industrial Estimator
- Construction Engineer
- Structural Engineer

MATH LEVEL

Students should have mastered algebra skills before entering this program. For a description of algebra skills, see the Basic Education section of this catalog.

CURRICULUM

The Architectural Technology Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 69 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-614-115	Architectural Drafting Prin	4
10-614-119	CAD Architectural-Introduction	1
10-614-121	Materials-Building Const	3
10-801-196	Oral/Interpers Communication	3
10-804-130	Math-Algebra/Trigonometry	3
10-809-197	Society-Amer Contemp	3
SEMESTER TOTAL		17

SECOND SEMESTER

10-614-120	CAD-Architectural	2
10-614-128	Residential Design/Drafting	5
10-614-131	Structural Draft-Wood/Steel	3
10-804-131	Math-Algebra/Inter	3
10-806-150	Physics I-Technical	3
	Elective	3
SEMESTER TOTAL		19

THIRD SEMESTER

10-614-135	Commercial Draft-Steel	4
10-614-141	Structural Draft-Concret	3
10-614-151	Estimating-Building	3
10-614-160	Structural Analysis	3
10-801-195	Communication-Written	3
SEMESTER TOTAL		16

FOURTH SEMESTER

10-614-118	Commercial Drafting Practices	5
10-614-146	Systems-Mechanical	3
10-801-197	Reporting-Technical	3
10-809-199	Psychology-Human Rel	3
	Elective	3
SEMESTER TOTAL		17

SUGGESTED ELECTIVES: Survey/Site Development (10-607-107), Architectural Models Construction (10-614-175), Green Architectural (10-614-117)

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-614-115 ARCHITECTURAL DRAFTING

PRINCIPLES ...traditional methods to develop basic architectural drafting techniques, linework, lettering, and geometric construction; terminology and construction methods; residential working drawing interpretation. (Prerequisite: Accepted into Architectural)

10-614-118 COMMERCIAL DRAFTING

PRACTICES ...this capstone course includes: highlights from program courses, preparing architectural working drawings for reinforced and pre-cast concrete framed buildings, the professional practice of architecture and the construction process. (Prerequisite: 10-614-135, Commercial Drafting-Steel)

10-614-119 CAD ARCHITECTURAL-

INTRODUCTION ...introduction of basic AutoCAD commands and drafting techniques used to produce architectural drawings.

10-614-121 MATERIALS-BUILDING

CONSTRUCTION ...CSI materials filing system, general requirements/forms, site work, concrete, masonry, metals, wood and plastics, thermal/moisture protection, doors/windows, finishes and specialties, equipment/furnishings, special construction, and conveying systems. (Prerequisite: Accepted into Architectural)

10-614-128 RESIDENTIAL DESIGN/DRAFTING

...residential design principles are incorporated in team projects and presentations while sketching, architectural drafting techniques using traditional and CAD methods are used to develop residential working drawings.

10-614-131 STRUCTURAL DRAFT-WOOD/STEEL

...application of math to buildings, structural wood, and structural steel: standard methods of drawing structural wood and steel; familiarity with references used in structural wood and steel industries. (Prerequisites: 10-614-115, Architectural Drafting Principles; 10-614-121, Materials-Building Construction; 10-614-119, CAD Architectural-Intro)

10-614-135 COMMERCIAL DRAFTING-STEEL

...preparation of architectural working drawings for steel frame buildings: plans, elevations, sections, and details. (Prerequisites: 10-614-120, CAD Architectural; 10-614-131, Structural Drafting-Wood/Steel; 10-614-125, Residential Design/Drafting)

10-614-141 STRUCTURAL DRAFT-CONCRETE

...application of building loads and codes to determine structural member size, reinforced/prestressed concrete, precast concrete, and structural concrete drawing methods. (Prerequisites: 10-614-120, CAD-Architectural; 10-614-131, Structural Drafting-Wood/Steel)

10-614-146 SYSTEMS-MECHANICAL

...plumbing, HVAC/R, electrical systems, calculations, mechanical drafting, space requirements, codes, mechanical specification, and construction within the building. (Prerequisites: 10-614-125, Residential Design/Drafting; 10-614-120, CAD-Architectural; 10-806-150, Physics 1-Tech)

10-614-151 ESTIMATING-BUILDING

...residential materials take off and square foot material and labor costs along with construction techniques. (Prerequisites: 10-614-115, Architectural Drafting Principle; 10-614-121, Materials-Building Construction; 10-804-130, Algebra/Trigonometry)

10-614-160 STRUCTURAL ANALYSIS

...mathematical investigation of forces, force actions, beam and column design, properties of sections, and application to wood member structural design. (Prerequisites: 10-614-125, Residential Design/Drafting; 10-804-131, Algebra-Intermediate; 10-806-150, Physics 1-Tech).

Descriptions of courses not found on this page can be found in the back of the catalog.

Auto Collision Repair and Refinish Manager

ASSOCIATE DEGREE - TWO YEARS

Program Code 104051

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC.

Visit the Auto Collision Repair and Refinish Web site - Youth Auto Training Certification information

PROGRAM DESCRIPTION

This two-year program provides all the required technical training that the technical diploma offers. It also provides the student with the opportunity to pursue a supervisory or management career, to pursue an automotive industry related career, and to transfer credit to a four-year college.

Graduates of the program will have the same employment potential as the graduate of the two-year technical diploma with the additional opportunities for employment as:

- Insurance Adjuster and Appraiser
- Auto Collision Repair and Refinishing Center Supervisor
- Auto Collision Repair and Refinishing Center Department Manager
- Equipment and Supplies Specialist

Students will gain the experience of observing the various management positions that are available to them. The added experience of the management positions will allow the graduate to increase their value to the Auto Collision Repair and Refinishing Industry. The Auto Collision Repair and Refinish Manager Associate Degree will also provide the student with the opportunity to transfer credit to a four-year college, and pursue an automotive industry related career.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High School diploma or equivalent (Equivalency may be established through GED testing or other tests.)
- High school background in mathematics, science, and technology education

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of this program will receive all of the technical training that the two-year technical diploma program offers. In addition, the student will be provided with the opportunity to pursue a career as an Insurance Adjuster/Appraiser, Collision Center Owner, Collision Center Manager, and Manufacturers Representative.

INSURANCE ADJUSTER/APPRaiser:

Works closely with collision repair facilities to negotiate repair procedures and repair costs.

COLLISION CENTER OWNER: Owns and operates their own collision repair facility. May have several employees working for them.

COLLISION CENTER MANAGER: Oversees all aspects of the collision center operation; including writing estimates, working with insurance companies, and managing employees.

MANUFACTURERS REPRESENTATIVE:

Represents various manufacturers of paint and body supplies in either sales or as a technical representative.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Tech-Ed Teacher
- Collision Repair and Refinishing Instructor
- Automotive Engineer
- Insurance Adjuster or Appraiser

ACCREDITATION:

- Certified ASE training site
- I-CAR Automotive Steel GMA (MIG) Welding Qualification test site
- STAR - Spray Technique Analysis and Research training site

ASSOCIATION:

- National Institute for Automotive Service Excellence
- I-CAR Industry Training Alliance Member
- Wisconsin Auto Collision Technicians Association
- Bay Auto Body Association

CURRICULUM

The Auto Collision Repair and Refinish Manager Associate Degree is a two-year program. Upon graduation, a student will have completed 70 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-405-101	Auto Collision Ref-Intro	1
10-405-103	Auto Collision Repair	1
10-405-105	Auto Collision-Plas/Comp	2
10-405-109	Auto Refinish Surface Prep	2
10-405-113	Auto Collision Refinish App	3
10-405-117	Auto Collision Detailing	1
10-801-195	Communication-Written	3
10-801-197	Reporting-Technical	3
10-804-120	Math-Tech Algebra	3
SEMESTER TOTAL		19

SECOND SEMESTER

10-405-120	Auto Collision Finish Def	2
10-405-124	Auto Refinishing-Advanced	3
10-405-128	Auto Color Adjustment/Tint	3
10-405-131	Auto Coll Refin Occup Exp	1
10-405-132	Auto Collision Damage Rprts	2
10-809-197	Society-Amer Contemp Elective	3
SEMESTER TOTAL		17

THIRD SEMESTER

10-405-107	Auto Collision Trim/Hdware	1
10-405-111	Auto Glass/Hardware	2
10-405-115	Auto Collision Non-Struct	3
10-405-144	Auto Collision Welding	2
10-602-110	Auto Collision Mechanical Serv	3
10-801-196	Oral/Interpers Communication	3
10-809-199	Psychology-Human Rel	3
SEMESTER TOTAL		7

FOURTH SEMESTER

10-405-122	Auto Collision Damage Analy	2
10-405-126	Auto Collision Structural	3
10-405-130	Auto Collision Sectioning	3
10-405-133	Auto Coll Repair Occup Exp	1
10-405-146	Auto Collision Welding-Adv	2
10-602-117	Wiring/Schematics Tech	1
10-602-118	DC Electricity Technology	1
10-602-119	Auto Collision Electronics Elective	3
SEMESTER TOTAL		17

SUGGESTED ELECTIVES: 10-102-158 Business-Intro, 10-145-177 Small Business, 10-104-191 Customer Service Management.

NOTE: 10-405-100 and 10-405-102 may be taken in lieu of credit for 10-405-101 and 101-405-103.

NOTE: A student may start Auto Collision Repair or Auto Collision Refinishing, both must be completed to graduate. 10-405-101 and 10-405-103 are prerequisites for all courses.

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-405-101 AUTO COLLISION REFINISH-INTRODUCTION ...industry career opportunities and certifications, refinishing safety and environmental regulations, automotive paints, and paint application equipment.

10-405-103 AUTO COLLISION REPAIR ...industry career opportunities, expectations, and certifications, personal and shop safety, sheet metal characteristics and analysis, safe equipment use during basic repair procedures on dents and rust, sheet metal patch fabrication and installation, corrosion protection.

10-405-105 AUTO COLLISION-PLASTICS/COMPOSITES ...identification of automotive plastics, making repair or replace decisions, repair of plastics by plastic welding and the use of adhesives, and retexturing and refinishing of plastics and composites. (Corequisite: 10-405-101, Auto Collision Refinishing Intro)

10-405-107 AUTO COLLISION TRIM/HARDWARE ...safe removal and replacement procedures of: exterior and interior trim, restraint systems, vinyl tops and convertible tops, utilizing the correct tools, and industry accepted procedures.

10-405-109 AUTO REFINISHING SURFACE PREP ...planning the refinishing process, paint removal, cleaning and metal conditioning, sanding, masking, preparing adjacent panels for blending, and application of stone resistant materials. (Corequisite: 10-405-101, Auto Collision Refinishing Intro)

10-405-111 AUTOMOBILE GLASS/HARDWARE ...glass types, functions, performance, tools, air and water leak diagnosis and repair, safe repair, and replacement procedures for auto glass, and their related components; utilizing industry accepted procedures.

10-405-113 AUTO COLLISION REFINISH APPLICATION ...the painting environment, using air supply equipment, mixing paint, and the application of undercoats and topcoats. (Corequisite: 10-405-101, Auto Collision Refinishing Intro)

10-405-115 AUTO COLLISION NON-STRUCTURAL ...vehicle construction, part identification, non-structural damage analysis, repair sequence planning, non-structural panel replacement procedures and tool use, non-structural panel repair procedures, corrosion protection, and time management skills for repair procedures. (Prerequisite: 10-405-103, Auto Collision Repair; 10-405-107, Auto Collision Trim/Hardware)

10-405-117 AUTO COLLISION DETAILING ...proper vehicle detailing, including interior cleaning, engine compartment cleaning, exterior cleaning, repairing minor surface defects and buffing, and application of decals, stripes and graphics.

10-405-120 AUTO COLLISION FINISH DEFECTS ...diagnosis and repair of finish defects, including contamination defects, spray technique defects, drying and curing problems, defects from improper preparation, environmental damage, and paint film failures. (Prerequisites: 10-405-101, Auto Collision Refinishing Intro; 10-405-109, Auto Surface Prep for Collision Refinishing; 10-405-113, Auto Collision Refinish Application Systems)

10-405-122 AUTO COLLISION DAMAGE ANALYSIS ...vehicle construction, collision forces, structural damage analysis, measuring equipment, damage diagnosis, and repair planning.

10-405-124 AUTO REFINISHING-ADVANCED ...advanced vehicle refinishing techniques including blending, tri-coat finishes, and custom painting. (Prerequisites: 10-405-101, Auto Collision Refinishing Intro; 10-405-109, Auto Surface Prep for Collision Refinishing; 10-405-113, Auto Collision Refinish Application Systems)

10-405-126 AUTO COLLISION STRUCTURAL ...hydraulic pulling systems, pulling procedures, stress relieving, steel types, straightening procedures for front, rear, side and roof damage, and frame and suspension alignment. (Prerequisites: 10-405-103, Auto Collision Rep; 10-405-107, Collision Trim/Hardware; 10-405-111, Auto Glass/Hardware; 10-405-115, Collision Non-Structural; 10-405-122, Collision Damage Analysis; 10-442-144, Collision Welding; 10-602-110, Collision Mechanical Service)

10-405-128 AUTO COLOR ADJUSTMENT/TINT...color theory, color movement, color adjustment and testing color match. (Prerequisites: 10-405-101, Auto Collision Refinishing Intro; 10-405-113, Auto Collision Refinish Appl Systems)

10-405-130 AUTO COLLISION SECTIONING ...full structural panel replacement guidelines and procedures, partial structural panel guidelines and procedures, sectioning joints required in replacement of: quarter panels, front rails, rear rails, rocker panels, A-pillars, B-pillars, floor panels, and full body sectioning. (Prerequisites: 10-405-103, Auto Collision Rep; 10-405-107, Collision Trim/Hardware; 10-405-111, Auto Glass/Hardware; 10-405-115, Collision Non-Structural; 10-405-122, Collision Damage Analysis; 10-442-144, Collision Welding; 10-602-110, Collision Mechanical Service)

10-405-131 AUTO COLLISION REFINISHING OCCUPATIONAL EXPERIENCE ...utilize the program skills learned in the auto collision refinishing center environment. The student will be required to refinish vehicle damage with the skills learned to industry guidelines and timelines.

10-405-132 AUTO COLLISION DAMAGE REPORTS ...vehicle body construction, damage analysis, vehicle identification, reference manuals, and writing damage reports both manually and with the aid of a computer.

10-405-133 AUTO COLLISION REPAIR OCCUPATIONAL EXPERIENCE ...utilize the program skills learned in the auto collision center environment. The student will be required to repair vehicle damage with the skills learned to industry guidelines, and timelines.

Descriptions of courses not found on this page can be found in the back of the catalog.

Auto Collision Repair and Refinishing Technology

TECHNICAL DIPLOMA - TWO YEARS

Program Code 324051

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC.

Visit the Auto Collision Repair and Refinish Web site - Youth Auto Training Certification information

PROGRAM DESCRIPTION

Auto Collision Repair and Refinish Technology prepares students to repair and refinish damaged bodies and parts of automobiles and light trucks.

Graduates of the Auto Collision Repair and Refinish Technology Program will be able to:

- Straighten damaged autobody sheetmetal.
- Repair plastic and composite body parts.
- Refinish automobile body parts.
- Repair and replace stationary glass.
- Repair damaged automobile and light truck frames.
- Repair unibody structural damage.
- Estimate collision damage repair costs.
- Auto Collision welding procedures.
- Repair manual and passive restraint systems.
- Diagnose problems in automotive electrical, electronic, and mechanical systems.
- Repair steering and suspension systems.
- Qualify for Automotive Service Excellence Autobody and Paint Certification Exam.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High School diploma or equivalent (Equivalency may be established through GED testing or other tests.)
- High school background in mathematics, science, and technology education

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

ACCREDITATION:

- Certified ASE training site
- I-CAR Automotive Steel GMA (MIG) Welding Qualification test site
- STAR - Spray Technique Analysis and Research training site

ASSOCIATION:

- National Institute for Automotive Service Excellence
- I-CAR Industry Training Alliance Member
- Wisconsin Auto Collision Technicians Association
- Bay Auto Body Association

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as an Auto Collision Repair Technician, Auto Collision Refinishing Technician, Frame and Alignment Technician, and Trim and Glass Installer.

AUTO COLLISION REPAIR TECHNICIAN:

Repairs damaged bodies of cars and light trucks; removes damaged panels and welds in new ones; removes and replaces accessories, glass, electrical parts, and interior trim; repairs or replaces plastic or composite parts; and straightens dents in sheet metal panels to restore the vehicle to pre-accident condition.

AUTO COLLISION REFINISHING

TECHNICIAN: Completes the refinishing phase of all repairs on cars, trucks, and fleet vehicles; does all stages of priming, sanding and sealing prior to the paint application; determines the type and color of paint to do the refinishing; is familiar with mixing, tinting, and shading; as well as the application of color for matching; and buffs, polishes, stripes, and details vehicle to complete the repair job.

FRAME AND ALIGNMENT SPECIALIST:

Straightens, welds, replaces, and aligns all types of frames and suspensions of cars and trucks to restore them to factory specifications.

UNI-BODY REPAIR SPECIALIST: Repairs unitized vehicles by analyzing, measuring, and pulling the unibody structure to the proper dimensions; and replaces structural parts that are not repairable using proper structural parts sectioning techniques to return the vehicle to factory specifications.

TRIM AND GLASS INSTALLER: Removes, replaces, or repairs all types of glass or glass-related problems on vehicles.

CURRICULUM

The Auto Collision Repair and Refinish Technology Technical Diploma is a two-year, four-semester program. Upon graduation, a student will have completed 55 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-405-101	Auto Collision Ref-Intro	1
10-405-105	Auto Collision-Plas/Comp	2
10-405-109	Auto Refinish Surface Prep	2
10-405-113	Auto Collision Refinish App	3
10-405-117	Auto Collision Detailing	1
31-801-385	Communicating-Writing	1
31-804-301	Math 1-Trades	2
32-405-320	Auto Collision Ind Shadow	1
SEMESTER TOTAL		13

SECOND SEMESTER

10-103-111	Micro: Windows-Introduction	1
10-103-121	Micro: Word-Introduction	1
10-405-120	Auto Collision Finish Def	2
10-405-124	Auto Refinishing-Advanced	3
10-405-128	Auto Color Adjustment/Tint	3
10-405-132	Auto Collision Damage Rprts	2
32-806-353	Science-Mechanics	2
SEMESTER TOTAL		14

THIRD SEMESTER

10-405-103	Auto Collision Repair	1
10-405-107	Auto Collision Trim/Hdware	1
10-405-111	Auto Glass/Hardware	2
10-405-115	Auto Collision Non-Struct	3
10-405-144	Auto Collision Welding	2
10-602-110	Auto Collision Mechanical Serv	3
31-801-386	Communicating Effectively	1
SEMESTER TOTAL		13

FOURTH SEMESTER

10-405-122	Auto Collision Damage Analy	2
10-405-126	Auto Collision Structural	3
10-405-130	Auto Collision Sectioning	3
10-405-146	Auto Collision Welding-Adv	2
10-602-117	Wiring/Schematics Tech	1
10-602-118	DC Electricity Technology	1
10-602-119	Auto Collision Electronics	1
31-809-301	Social Science Survey	2
SEMESTER TOTAL		15

NOTE: 10-405-100 and 10-405-102 may be taken in lieu of credit for 10-405-101 and 101-405-103.

NOTE: A student may start Auto Collision Repair or Auto Collision Refinishing, both must be completed to graduate. 10-405-101 and 10-405-103 are prerequisites for all courses.

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-405-101 AUTO COLLISION REFINISH-INTRODUCTION ...industry career opportunities and certifications, refinishing safety and environmental regulations, automotive paints, and paint application equipment.

10-405-103 AUTO COLLISION REPAIR ...industry career opportunities, expectations, and certifications, personal and shop safety, sheet metal characteristics and analysis, safe equipment use during basic repair procedures on dents and rust, sheet metal patch fabrication and installation, corrosion protection.

10-405-105 AUTO COLLISION-PLASTICS/COMPOSITES ...identification of automotive plastics, making repair or replace decisions, repair of plastics by plastic welding and the use of adhesives, and retexturing and refinishing of plastics and composites. (Corequisite: 10-405-101, Auto Collision Refinishing Intro)

10-405-107 AUTO COLLISION TRIM/HARDWARE ...safe removal and replacement procedures of: exterior and interior trim, restraint systems, vinyl tops and convertible tops, utilizing the correct tools, and industry accepted procedures.

10-405-109 AUTO REFINISHING SURFACE PREP ...planning the refinishing process, paint removal, cleaning and metal conditioning, sanding, masking, preparing adjacent panels for blending, and application of stone resistant materials. (Corequisite: 10-405-101, Auto Collision Refinishing Intro)

10-405-111 AUTOMOBILE GLASS/HARDWARE ...glass types, functions, performance, tools, air and water leak diagnosis and repair, safe repair, and replacement procedures for auto glass, and their related components; utilizing industry accepted procedures.

10-405-113 AUTO COLLISION REFINISH APPLICATION ...the painting environment, using air supply equipment, mixing paint, and the application of undercoats and topcoats. (Corequisite: 10-405-101, Auto Collision Refinishing Intro)

10-405-115 AUTO COLLISION NON-STRUCTURAL ...vehicle construction, part identification, non-structural damage analysis, repair sequence planning, non-structural panel replacement procedures and tool use, non-structural panel repair procedures, corrosion protection, and time management skills for repair procedures. (Prerequisite: 10-405-103, Auto Collision Repair; 10-405-107, Auto Collision Trim/Hardware)

10-405-117 AUTO COLLISION DETAILING ...proper vehicle detailing, including interior cleaning, engine compartment cleaning, exterior cleaning, repairing minor surface defects and buffing, and application of decals, stripes, and graphics.

10-405-120 AUTO COLLISION FINISH DEFECTS ...diagnosis and repair of finish defects, including contamination defects, spray technique defects, drying and curing problems, defects from improper preparation, environmental damage, and paint film failures. (Prerequisites: 10-405-101, Auto Collision Refinishing Intro; 10-405-109, Auto Surface Prep for Collision Refinishing; 10-405-113, Auto Collision Refinish Application Systems)

10-405-122 AUTO COLLISION DAMAGE ANALYSIS ...vehicle construction, collision forces, structural damage analysis, measuring equipment, damage diagnosis, and repair planning.

10-405-124 AUTO REFINISHING-ADVANCED ...advanced vehicle refinishing techniques including blending, tri-coat finishes, and custom painting. (Prerequisites: 10-405-101, Auto Collision Refinishing Intro; 10-405-109, Auto Surface Prep for Collision Refinishing; 10-405-113, Auto Collision Refinish Application Systems)

10-405-126 AUTO COLLISION STRUCTURAL ...hydraulic pulling systems, pulling procedures, stress relieving, steel types, straightening procedures for front, rear, side, and roof damage, and frame and suspension alignment. (Prerequisites: 10-405-103, Auto Collision Rep; 10-405-107, Collision Trim/Hardware; 10-405-111, Auto Glass/Hardware; 10-405-115, Collision Non-Structural; 10-405-122, Collision Damage Analysis; 10-442-144, Collision Welding; 10-602-110 Collision Mechanical Service)

10-405-128 AUTO COLOR ADJUSTMENT/TINT ...color theory, color movement, color adjustment and testing color match. (Prerequisites: 10-405-101, Auto Collision Refinishing Intro; 10-405-113, Auto Collision Refinish Application Systems)

10-405-130 AUTO COLLISION SECTIONING ...full structural panel replacement guidelines and procedures, partial structural panel guidelines and procedures, sectioning joints required in replacement of: quarter panels, front rails, rear rails, rocker panels, A-pillars, B-pillars, floor panels, and full body sectioning. (Prerequisites: 10-405-103, Auto Collision Rep; 10-405-107, Collision Trim/Hardware; 10-405-111, Auto Glass/Hardware; 10-405-115, Collision Non-Structural; 10-405-122, Collision Damage Analysis; 10-442-144, Collision Welding; 10-602-110, Collision Mechanical Service)

10-405-132 AUTO COLLISION DAMAGE REPORTS ...vehicle body construction, damage analysis, vehicle identification, reference manuals, and writing damage reports both manually and with the aid of a computer.

10-405-144 AUTO COLLISION WELDING ...welding processes, machines and accessories, gas metal arc welding (wire), oxyacetylene cutting, welding and brazing, and gas tungsten arc welding.

10-405-146 AUTO COLLISION WELDING-ADVANCED ...advanced welding procedures necessary for an Auto Collision Repair Technician, including GTAW on aluminum along with GMAW on 1/8 inch thick or thicker steel.

10-602-110 AUTO COLLISION MECHANICAL SERVICE...automotive systems diagnostic, repair and adjustment procedures covering commonly effected areas of the automobile regularly repaired by an Auto Collision Technician.

10-602-117 WIRING/SCHEMATICS TECHNOLOGY ...electrical symbols, wiring diagrams, tracing wiring circuits, and diagnosing electrical problems with wiring diagrams, **design an automotive electrical circuit. (Prerequisite: 10-602-118, DC Electricity Tech)

10-602-118 DC ELECTRICITY TECHNOLOGY ...ohms, amps, voltage, wire repair, series and parallel circuits, meter use, magnetism, **research paper comparing and contrasting A/C and D/C electrical applications.

10-602-119 AUTO COLLISION ELECTRONICS ...electrical circuit diagnosis, troubleshooting and repair of commonly effected circuits that an Auto Collision Technician will encounter.

32-405-320 AUTO COLLISION INDUSTRY SHADOWING ...an opportunity to experience the auto collision industry working environment. Course will facilitate student's opportunities to meet technicians and shop owners, and to observe all facets of the industry.

Descriptions of courses not found on this page can be found in the back of the catalog.

Automotive Maintenance Technician Program Code 314043

TECHNICAL DIPLOMA - ONE YEAR

Offered at the Marinette campus. This diploma also fulfills the first year of the Automotive Technician Technical Diploma program offered in Green Bay. Admissions, registration, or counselor: (715) 735-9361. Toll free: (800) 422-NWTC. Visit the Automotive Maintenance Technician Web site. - Youth Auto Training Certification information

PROGRAM DESCRIPTION

There are over 162 million automobiles and trucks on our highways. One out of every seven employed persons works in the manufacturing, distribution, maintenance, or commercial use of motor vehicles. Because of the greater emphasis on electronics and computer systems, many more trained persons will be required to maintain these vehicles. The Automotive Maintenance Technician program prepares students for job entry in an automotive service department.

Major emphasis is placed on realistic and practical shop applications.

- Ignition systems
- Emissions
- Brakes
- Charging and starting systems
- Suspension, 4-wheel alignment
- Fuel injection, fuel delivery systems
- Automotive Preventative Maintenance

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Equivalency may be established through GED testing or other tests.)
- High school background in mathematics, science, and industrial education classes

MATH LEVEL

Students should have mastered basic math before entering this program. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as a General Automotive Service Technician, Alignment Specialist, Preventive Maintenance Technician, Brake Specialist, or Service Writer.

GENERAL AUTOMOTIVE SERVICE

TECHNICIAN: diagnoses and locates troubles and makes the right parts replacements and adjustments on cars and light trucks.

ALIGNMENT SPECIALIST: does front and four wheel alignment using computerized alignment equipment.

PREVENTIVE MAINTENANCE TECHNICIAN:

provides regularly scheduled maintenance as per manufacturers' specifications.

BRAKE SPECIALIST: performs brake systems maintenance and component replacement.

SERVICE WRITER: meets and greets customers, listens to and records customer repair requests, and processes work orders for the automotive service technicians.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Fleet Dispatcher
- Shop Supervisor
- Specialty Shop Owner
- Specialty Technician

CURRICULUM

The Automotive Maintenance Technician Technical Diploma is a one-year, two-semester program. Upon graduation, a student will have completed 32 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-602-114	Brake Technology	5
10-602-115	Engine Performance I Tech	5
10-602-117	Wiring/Schematics Tech	1
10-602-118	DC Electricity Technology	1
10-602-160	Auto Preparation Technology	1
31-442-350	Welding-Machine Trades	2
31-801-385	Communicating-Writing	1
SEMESTER TOTAL		16

SECOND SEMESTER

10-602-124	Steering/Suspension Tech	5
10-602-126	Chassis Electricity Tech	2
10-602-128	Auto Engine Performance II	5
10-602-129	Automotive Emission Systems	1
31-801-386	Communicating Effectively	1
31-804-301	Math 1-Trades	2
SEMESTER TOTAL		16

NOTE: A second year leading to a two-year Automotive Technician Technical Diploma can be taken on the Green Bay campus.

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-602-114 BRAKE TECHNOLOGY ...brake safety, wheel bearings, brake preventive maintenance, disc and drum brake overhaul, rotor and drum machining, master cylinder, brake lines and hoses, safety switches and valves, power and anti-lock brakes, *10 hours off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-115 ENGINE PERFORMANCE I TECHNOLOGY ...engine safety, preventive maintenance, four stroke theory, ignition systems, test equipment, scopes, *10 hour off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-117 WIRING/SCHEMATICS TECHNOLOGY ...electrical symbols, wiring diagrams, tracing wiring circuits, and diagnosing electrical problems with wiring diagrams, **design an automotive electrical circuit. (Prerequisite: 10-602-118, DC Electricity Tech)

10-602-118 DC ELECTRICITY TECHNOLOGY ...ohms, amps, voltage, wire repair, series and parallel circuits, meter use, magnetism, **research paper comparing and contrasting A/C and D/C electrical applications.

10-602-124 STEERING/SUSPENSION TECHNOLOGY ...steering and suspension safety, tire types and ratings, wheel bearings, balance and alignment, wheel and tire runout, shocks, suspension components, steering components, steering gears, *10 hour off campus work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-126 CHASSIS ELECTRICITY TECHNOLOGY ...batteries, starting and charging system components, lighting systems components, indicator system components, horn system components, motor driven system components, **research paper on automotive hybrids. (Corequisites: 10-602-118, DC Electricity Tech and 10-602-117, Wiring/Schematic Tech)

10-602-128 AUTOMOTIVE ENGINE PERFORMANCE II ...engine fuel safety, fuel type ratings, fuel supply components, fuel injection systems, exhaust systems, forced induction and intake, computer input/output information and scanners. (Corequisites: 10-602-118, DC Electricity Tech and 10-602-117, Wiring/Schematic Tech)

10-602-129 AUTOMOTIVE EMISSION SYSTEMS ...vehicle emission control system theory, theory of component operation, diagnostics and typical service procedures. (Corequisites: 10-602-118, DC Electricity Tech and 10-602-117, Wiring/Schematic Tech)

10-602-160 AUTO PREPARATION TECHNOLOGY ...personal safety, auto equipment safety, repair order information, industry computer applications, repair tools, fasteners, chemicals, vehicle preventive maintenance, **research OSHA automotive shop safety requirements.

31-442-350 WELDING-MACHINE TRADES ...oxyacetylene welding, brazing, soldering; cutting, hardsurfacing, out-of-position welding, arc welding of machines/accessories, running beads, types of joints, welding thin gauge, arc cutting, and heating.

Descriptions of courses not found on this page can be found in the back of the catalog.

Automotive Technician

Program Code 324042

TECHNICAL DIPLOMA - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC. The first year of the program is also offered on the Marinette campus. Course information: (715) 735-9361. Toll free: (800) 422-NWTC. Visit the Auto Collision Repair and Refinish Web site - Youth Auto Training Certification information

PROGRAM DESCRIPTION

Automotive Technician prepares students for work in an automotive service department. Students learn to repair and service all mechanical parts of the automobile under conditions similar to those in an actual shop environment.

Graduates of the Automotive Technician Program will be able to:

- Diagnose and repair automotive engine performance systems.
- Diagnose and repair automotive suspension and steering systems.
- Diagnose and repair automotive brake systems.
- Diagnose and repair automotive DC electrical systems.
- Diagnose and repair automotive electronic systems.
- Diagnose and repair automotive heating and air conditioning systems.
- Diagnose and repair automatic transmission/transaxles.
- Diagnose and repair general internal automotive engines.
- Diagnose and repair automotive manual drive train and axles.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Equivalency may be established through GED testing or other tests.)
- High school background in mathematics, science, and technology education

MATH LEVEL

Students should have mastered basic math before entering this program. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as an Automotive Service Technician, Automotive Electronics Specialist, Engine Repair Specialist, Transmission and Drive Train Specialist, Alignment Specialist, Service Manager, Assistant Service Manager, Service Writer, or Brake Specialist.

AUTOMOTIVE SERVICE TECHNICIAN:

diagnoses and locates trouble, makes the necessary repairs, makes the right parts replacements and adjustments on cars and light trucks.

AUTOMOTIVE ELECTRONICS SPECIALIST:

diagnoses and locates problems, makes necessary repairs as related to engine body and transmission computer controls.

ENGINE REPAIR SPECIALIST:

disassembles engines, inspects engine components, reassembles to factory specifications.

TRANSMISSION AND DRIVE TRAIN

SPECIALIST: diagnoses and locates problems, makes necessary repairs to automatic and standard transmissions and drive members.

ALIGNMENT SPECIALIST:

diagnoses, makes repairs, and adjusts suspension using computerized alignment equipment.

SERVICE MANAGER or ASSISTANT SERVICE

MANAGER: meets customers and works with the technicians to help diagnose and locate vehicle trouble areas.

SERVICE WRITER:

meets and greets customers, listens to and records customer repair requests, processes work orders for the automotive service technicians.

BRAKE SPECIALIST: perform brake system maintenance and component replacement.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Shop Supervisor
- Specialty Technician
- Fleet Dispatcher
- Specialty Repair Shop Owner
- Automotive Instructor

CURRICULUM

The Automotive Technician Technical Diploma is a two-year, four-semester program. Upon graduation, a student will have completed 64 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-602-114	Brake Technology	5
10-602-115	Engine Performance I Tech	5
10-602-117	Wiring/Schematics Tech	1
10-602-118	DC Electricity Technology	1
10-602-160	Auto Preparation Technology	1
31-442-350	Welding-Machine Trades	2
31-801-385	Communicating-Writing	1
SEMESTER TOTAL		16

SECOND SEMESTER

10-602-124	Steering/Suspension Tech	5
10-602-126	Chassis Electricity Tech	2
10-602-128	Auto Engine Performance II	5
10-602-129	Automotive Emission Systems	1
31-801-386	Communicating Effectively	1
31-804-301	Math 1-Trades	2
SEMESTER TOTAL		16

THIRD SEMESTER

10-602-135	Heating/Cooling AC Tech	4
10-602-137	Electronics Computer Tech	3
10-602-145	Engine Repair Technology	5
31-419-311	Hydraulics-Applied	2
32-806-353	Science-Mechanics	2
SEMESTER TOTAL		16

FOURTH SEMESTER

10-602-138	Auto Trans/Transaxle Tech	6
10-602-146	Manual Transmission/Differ	4
10-602-147	Electronics Mfg Specifics	3
31-809-301	Social Science Survey	2
32-405-306	Auto Body Fundamentals	1
SEMESTER TOTAL		16

The Automotive Technician Program is ASE certified in all eight automotive program areas. All staff are ASE certified.

NOTE: The first year of this program is offered on both the Marinette and Green Bay campuses.

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-602-114 BRAKE TECHNOLOGY ...brake safety, wheel bearings, brake preventive maintenance, disc and drum brake overhaul, rotor and drum machining, master cylinder, brake lines and hoses, safety switches and valves, power and anti-lock brakes, *10 hours off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-115 ENGINE PERFORMANCE I TECHNOLOGY ...engine safety, preventive maintenance, four stroke theory, ignition systems, test equipment, scopes, *10 hour off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-117 WIRING/SCHEMATICS TECHNOLOGY ...electrical symbols, wiring diagrams, tracing wiring circuits, and diagnosing electrical problems with wiring diagrams, **design an automotive electrical circuit. (Prerequisite: 10-602-118, DC Electricity Tech)

10-602-118 DC ELECTRICITY TECHNOLOGY ...ohms, amps, voltage, wire repair, series and parallel circuits, meter use, magnetism, **research paper comparing and contrasting A/C and D/C electrical applications.

10-602-124 STEERING/SUSPENSION TECHNOLOGY ...steering and suspension safety, tire types and ratings, wheel bearings, balance and alignment, wheel and tire runout, shocks, suspension components, steering components, steering gears, *10 hour off campus work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-126 CHASSIS ELECTRICITY TECHNOLOGY ...batteries, starting and charging system components, lighting systems components, indicator system components, horn system components, motor driven system components, **research paper on automotive hybrids. (Corequisites: 10-602-118, DC Electricity Tech and 10-602-117, Wiring/Schematic Tech)

10-602-128 AUTOMOTIVE ENGINE PERFORMANCE II ...engine fuel safety, fuel type ratings, fuel supply components, fuel injection systems, exhaust systems, forced induction and intake, computer input/output information and scanners. (Corequisites: 10-602-118, DC Electricity Tech and 10-602-117, Wiring/Schematic Tech)

10-602-129 AUTOMOTIVE EMISSION SYSTEMS ...vehicle emission control system theory, theory of component operation, diagnostics and typical service procedures. (Corequisites: 10-602-118, DC Electricity Tech and 10-602-117, Wiring/Schematic Tech)

10-602-135 HEATING/COOLING AC TECHNOLOGY ...related system safety, engine coolant flushing/recycling, heating system components, refrigerants, A/C systems, A/C test equipment, A/C evacuation recycling and recharging, *10 hour off campus work experience. (Prerequisite: 10-602-160, Auto Preparation Technology) (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-137 ELECTRONICS COMPUTER TECHNOLOGY ...knowledge and skill development related to computer controlled vehicle systems ranging from chassis systems through extensive emphasis on engine performance and driveability related controls, **build an electrical circuit utilizing solid state electronic components. (Prerequisites: 10-602-118, DC Electricity Tech; 10-602-117, Wiring/Schematic Tech; 10-602-126, Chassis Electricity Tech)

10-602-138 AUTO TRANS/TRANSAXLE TECHNOLOGY ...transmission/transaxle safety, transmission fluid, transmission maintenance, pressure tests, external adjustments, transmission removal, transmission overhaul, *10 hour off campus selected work experience. (Prerequisites: 10-602-118, DC Electricity Tech; 10-602-117, Wiring/Schematic Tech) (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-145 ENGINE REPAIR TECHNOLOGY ...engine lubrication system, four stroke theory, valve timing, engine failures, valve service, cylinder head replacement, engine replacement, engine repair, *10 hour off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-146 MANUAL TRANSMISSION/DIFFERENTIAL TECHNOLOGY ...drive train safety, universal joints, half-shafts, transmission repair/overhaul, clutch, shift linkage, four-wheel drive, differential, *10 hour off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-147 ELECTRONICS MANUFACTURES SPECIFICS ...GM-(CCC), electronic and port fuel injection; Ford-electronic engine control IV, single and multipoint fuel injection; Bosch fuel injection systems, **research paper on manufacture's new product development regarding the electronic components. (Prerequisites: 10-602-118, DC Electricity Tech, 10-602-117, Wiring/Schematic Tech; 10-602-126, Chassis Electricity Tech)

10-602-160 AUTO PREPARATION TECHNOLOGY ...personal safety, auto equipment safety, repair order information, industry computer applications, repair tools, fasteners, chemicals, vehicle preventive maintenance, **research OSHA automotive shop safety requirements.

31-442-350 WELDING-MACHINE TRADES ...oxyacetylene welding, brazing, soldering; cutting, hardsurfacing, out-of-position welding, arc welding of machines/accessories, running beads, types of joints, welding thin gauge, arc cutting, and heating.

32-405-306 AUTO BODY FUNDAMENTALS FOR AUTO MECHANICS ...body construction, interior trim, interior mechanics, body alignment, wind noise and water leaks, plastic parts, glass replacement, and automotive paints.

Descriptions of courses not found on this page can be found in the back of the catalog.

Automotive Technology

Program Code 106023

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Automotive Technology prepares students for work in an automotive repair facility. Students learn to diagnose and service automobiles under conditions similar to an actual repair facility. Students will develop repair facility management skills such as telephone etiquette, communication techniques, operation, managing, and organization skills.

Graduates of the Automotive Technology Program will be able to:

- Diagnose and repair automatic transmission/transaxles.
- Diagnose and repair automotive heating and air conditioning systems.
- Diagnose and repair automotive manual drive train and axles.
- Diagnose and repair automotive brake systems.
- Diagnose and repair internal automotive engine components.
- Diagnose and repair automotive suspension and steering systems.
- Diagnose and repair automotive electrical system problems.
- Diagnose and repair automotive electronic engine control systems.
- Communicate effectively with the customer.
- Complete customer repair orders accurately.
- Organize a daily work schedule.
- Tabulate a daily time sheet of technicians repair work.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

MATH LEVEL

Students should have mastered basic math before entering this program. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as an Automotive Service Technician, Automotive Electronics Specialist, Engine Repair Specialist, Transmission and Drive Train Specialist, Alignment and Suspension Specialist, Service Writer, Shop Foreman, Service Manager, Parts Manager, Warranty Claims Person, or an Owner/Operator.

SHOP FOREMAN: Works with the technician and customer to get vehicles repaired correctly.

PARTS MANAGER: Organizes and oversees the parts department. Works with the technicians to get the correct parts to repair the vehicles.

WARRANTY CLAIMS PERSON: Calculates the amount of time spent repairing a vehicle compared to what the manufacturer will allow.

OWNER/OPERATOR: Owns and operates his/her own repair facility, may have employees working for them.

Recommended off campus work experiences; 20 hours in each area;

- Automotive Service Writer
- Automotive Service Manager
- Automotive Shop Foreman
- Automotive Parts Manager
- Automotive Warranty Claims Person
- Automotive Service Department Manager
- Automotive Human Relations Manager
- Other areas with instructors approval

CURRICULUM

The Automotive Technology Associate Degree is a two-year, four semester program. Upon graduation, a student will have completed 72 credits.

FIRST SEMESTER

Course No.	Description	Credits
* 10-602-114	Brake Technology	5
* 10-602-115	Engine Performance I Tech	5
**10-602-117	Wiring/Schematics Tech	1
**10-602-118	DC Electricity Technology	1
**10-602-160	Auto Preparation Technology	1
10-801-196	Oral/Interpers Communication	3
10-804-120	Math-Tech Algebra	3
SEMESTER TOTAL		19

SECOND SEMESTER

* 10-602-124	Steering/Suspension Tech	5
**10-602-126	Chassis Electricity Tech	2
* 10-602-128	Auto Engine Performance II	5
10-602-129	Automotive Emission Systems	1
10-801-195	Communication-Written	3
10-809-197	Society-Amer Contemp	3
SEMESTER TOTAL		19

THIRD SEMESTER

* 10-602-135	Heating/Cooling AC Tech	4
**10-602-137	Electronics Computer Tech	3
* 10-602-145	Engine Repair Technology	5
10-801-197	Reporting-Technical	3
	Elective	3
SEMESTER TOTAL		18

FOURTH SEMESTER

* 10-602-138	Auto Trans/Transaxle Tech	6
* 10-602-146	Manual Transmission/Differ	4
10-809-199	Psychology-Human Rel	3
	Elective	3
SEMESTER TOTAL		16

SUGGESTED ELECTIVES:

10-602-147 Electronics Manufacture Specific-3 credits,
10-102-158 Business Introduction-3 credits,
10-104-191 Customer Service Management-3 credits

NOTE * A 3 to 5 page paper is required for each area experienced. The paper will include job title, work experience, responsibilities, normal work hours, and interpersonal skills required. Assess from your time on the job what possible classes and/or work experience would be beneficial to a person pursuing a job in this area. A grade in the work experience will be based on employer input and the paper.

NOTE: ** Specific project information to be obtained from program instructor.

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-602-114 BRAKE TECHNOLOGY ...brake safety, wheel bearings, brake preventive maintenance, disc and drum brake overhaul, rotor and drum machining, master cylinder, brake lines and hoses, safety switches and valves, power and anti-lock brakes, *10 hours off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-115 ENGINE PERFORMANCE I TECHNOLOGY ...engine safety, preventive maintenance, four stroke theory, ignition systems, test equipment, scopes, *10 hour off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-124 STEERING/SUSPENSION TECHNOLOGY ...steering and suspension safety, tire types and ratings, wheel bearings, balance and alignment, wheel and tire runout, shocks, suspension components, steering components, steering gears, *10 hour off campus work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-128 AUTOMOTIVE ENGINE PERFORMANCE II ...engine fuel safety, fuel type ratings, fuel supply components, fuel injection systems, exhaust systems, forced induction and intake, computer input/output information and scanners. (Corequisites: 10-602-118, DC Electricity Tech and 10-602-117, Wiring/Schematic Tech)

10-602-129 AUTOMOTIVE EMISSION SYSTEMS ...vehicle emission control system theory, theory of component operation, diagnostics and typical service procedures. (Corequisites: 10-602-118, DC Electricity Tech and 10-602-117, Wiring/Schematic Tech)

10-602-135 HEATING/COOLING AC TECHNOLOGY ...related system safety, engine coolant flushing/recycling, heating system components, refrigerants, A/C systems, A/C test equipment, A/C evacuation recycling and recharging, *10 hour off campus work experience. (Prerequisite: 10-602-160, Auto Preparation Technology) (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-138 AUTO TRANS/TRANSAXLE TECHNOLOGY ...transmission/transaxle safety, transmission fluid, transmission maintenance, pressure tests, external adjustments, transmission removal, transmission overhaul, *10 hour off campus selected work experience. (Prerequisites: 10-602-118, DC Electricity Tech; 10-602-117, Wiring/Schematic Tech) (Corequisite: 10-602-160, Auto Preparation Technology)

10-602-145 ENGINE REPAIR TECHNOLOGY ...engine lubrication system, four stroke theory, valve timing, engine failures, valve service, cylinder head replacement, engine replacement, engine repair, *10 hour off campus selected work experience. (Corequisite: 10-602-160, Auto Preparation Technology)

Descriptions of courses not found on this page can be found in the back of the catalog.

Business Administration Credit

Program Code 101041

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5435. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Business Administration Credit prepares learners for a career in credit management. The learners will comprehend the concepts of leadership, demonstrating promotion, control, and collection of consumer and business transactions.

Graduates of this program will be able to:

- Perform basic finance math calculations.
- Operate a micro-computer word processing program.
- Analyze business and personal financial statements.
- Construct a personal financial statement.
- Use financial counseling techniques.
- Assess how economic policies and changes in the level of business activity affect the credit industry.
- Write credit related documents.
- Use an electronic spreadsheet computer program, such as Excel.
- Use a financial calculator.
- Lead individuals to accomplished tasks.
- Demonstrate state and federal laws.
- Evaluate a family's personal financial management decisions.
- Collect past-due bills and payments.
- Evaluate the performance of a credit department.
- Make credit decisions.
- Conduct credit investigations.
- Screen credit applications.
- Complete applications for credit accounts.
- Promote the use of credit by customers.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- Basic math
- Ability to use computer keyboard

MATH LEVEL

Students should have mastered basic math before entering this program. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as Credit Manager Trainee, Assistant Credit Manager, Credit Administrator, Collector, Personal Banker, Loan Officer, and Financial Planning Assistant.

CREDIT MANAGER TRAINEE: learns all phases of operating a financial institution or business credit department, usually in preparation for a management position.

ASSISTANT CREDIT MANAGER: assists a branch or department manager in all phases of operation, including the extension, collection, and control of credit.

CREDIT ADMINISTRATOR: supports the credit process in the application of cash receipts, collection calls, and problem resolution.

COLLECTOR: contacts consumers or businesses to arrange payments and may become involved with legal aspects of collections.

PERSONAL BANKER: assists customers in opening accounts, explains bank services, and becomes involved in other financial institution services.

LOAN OFFICER: processes and investigates applications for credit and makes decisions on loan applications.

FINANCIAL PLANNING ASSISTANT: aids financial planner in areas such as stocks, bonds, treasury bills, and other investments. May need additional course work in areas of securities.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Credit Manager
- Bank Officer
- Investment Advisor

CURRICULUM

The Business Administration Credit Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 69 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-101-110	Accounting 1	4
10-103-103	Micro Basics MS Office 1	3
10-104-113	Credit-Consumer	3
10-801-195	Communication-Written	3
10-804-101	Math-Business	3
SEMESTER TOTAL		16

SECOND SEMESTER

10-102-101	Financial Applications	3
10-102-150	Law-Business	3
10-102-153	Finance-Personal	3
10-104-114	Credit-Business	3
10-801-196	Oral/Interpers Communication	3
10-809-199	Psychology-Human Rel	3
SEMESTER TOTAL		18

THIRD SEMESTER

10-102-160	Law-Credit	3
10-102-165	Collection Methods	2
10-102-172	Financial Statement Analy	3
10-104-121	Credit Management Practices	3
10-809-195	Economics	3
	Elective	3
SEMESTER TOTAL		17

FOURTH SEMESTER

10-102-122	Financial Inst-Mktg	3
10-102-174	Financial Counseling Tech	3
10-104-144	Credit Management Seminar	3
10-104-146	Credit Internship	3
10-809-197	Society-Amer Contemp	3
	Elective	3
SEMESTER TOTAL		18

SUGGESTED ELECTIVES: Accounting 2 (10-101-120), Abnormal Psychology (10-809-173)

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-102-122 FINANCIAL INSTITUTIONS-MARKETING ...fundamental concepts of marketing and the application of these concepts; as financial institutions enter the electronic era, effective marketing will be critical in determining the course of the industry.

10-102-150 LAW-BUSINESS ...common law contracts and sales contracts: formation, interpretation, performance, and discharge; the law of agency; corporations; and introduction to the American legal system: criminal and tort law, and global business issues.

10-102-153 FINANCE-PERSONAL ...income and occupations, financial spending plan development, purchasing consumer goods and services, risk management plan development, investment plan development, retirement and estate planning, and financial advising.

10-102-160 LAW-CREDIT ...Uniform Commercial Code, credit regulations, Wisconsin Consumer Protection Law, collection law, and bankruptcy.

10-102-165 COLLECTION METHODS ...classes of debtors, collection laws, pre-legal and legal methods used in collections, bad check collections, and skip tracing.

10-102-174 FINANCIAL COUNSELING TECHNIQUES ...assessing financial condition, identifying causes of financial problems, establishing solutions/goals, conducting telephone and in person sessions for consumers and businesses.

10-104-113 CREDIT-CONSUMER ...the role of consumer credit, loan processes, collections; financial advising and counseling; loan, promotion, and bank policies; consumer, commercial, mortgage loans, and credit cards.

10-104-114 CREDIT-BUSINESS ...credit in the economy, business credit, management and analysis of commercial credit, basis of decision-making, financial statement analysis and interpretation, credit and collection policies, international trade credit, and control of credit operations.

10-104-121 CREDIT MANAGEMENT PRACTICES ...manager's responsibilities/environment, planning, problem solving, organizational structure/cultures, staffing/human resources, leadership/teamwork, motivational techniques, communications, management controls, ineffective performers, and ethical business practices.

10-104-144 CREDIT MANAGEMENT SEMINAR ...case problems, research, and presentations related to credit administration, credit control, collections, marketing, effective management elements, and management functions.

10-104-146 CREDIT INTERNSHIP ...internship or field observations, career exploration, self exploration, career planning, and career placement. Course should be taken during the last semester.

Descriptions of courses not found on this page can be found in the back of the catalog.

Civil Engineering Technology Program Code 106071

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC. Visit the Civil Engineering Technology Web site at www.nwtc.edu.

PROGRAM DESCRIPTION

Graduates of this program typically find employment in the Engineering or Surveying field. Careers include positions in Computer Aided Drafting and Design (CADD), construction administration and inspection, or surveying.

- Students will understand operating systems, spreadsheets, word processing, CAD and other software products to efficiently perform assignments in an engineering office environment.
- Students will be able to solve engineering, surveying and materials testing problems using algebra, trigonometry, and calculus.
- Students will be capable of performing design and routine testing procedures related to construction materials. These materials include soils, Portland cement concrete, and hot mix asphalt.
- Students will be capable of understanding the legal aspects of land surveying and use land surveying instruments to collect data necessary to produce topographic maps, establish horizontal and vertical control, and to lay out various civil engineering projects.
- The student will understand and be able to describe different methods of building construction and elements of inspection and construction documentation.
- The student will be capable of producing written and oral reports related to work within the industry and learn techniques to adapt to the work environment.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Equivalency may be established through GED testing or other tests.)
- High school background in mathematics, science, and drafting
- Algebra and trigonometry skills
- Attendance at orientation or a planned meeting with program staff is required.

MATH LEVEL

Students must have mastered algebra and trigonometry skills and have completed or tested out of Algebra/Trigonometry, course 10-804-130, before taking the following First Semester program courses

- Soil Mechanics
- Surveying / Mapping

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as a Civil Construction Inspector, Civil Drafter, Civil Soils-Materials Technician, and Survey Technician.

CIVIL CONSTRUCTION INSPECTOR: examines and interprets prints and specifications; confers with contractors and owners to enforce contract specifications, building codes, and zoning ordinances; and also inspects soils, asphalt, concrete, building construction, and underground utilities at the project site.

CIVIL DRAFTER: drafts detailed construction drawings, survey drawings, topographical profiles, related maps, and specification sheets used in planning construction of highways and streets, buildings, river and harbor improvements, landfills, flood control, drainage, railroads, airports, water and sewer systems, and other civil engineering projects using Computer-Aided Drafting systems.

CIVIL SOILS-MATERIALS TECHNICIAN: samples and performs tests on soils, asphalt, concrete, aggregate, and other construction materials; and identifies and classifies soil samples for foundation construction, and environmental purposes.

SURVEY TECHNICIAN: obtains data and makes computations pertaining to angles, distances, elevations, points, contours, and other purposes using levels, total station, data collectors, transits, theodolites, distance measurement equipment, global positioning systems, and other surveying instruments following approved surveying practices.

The program also meets the educational requirements to become a Licensed Land Surveyor in the State of Wisconsin.

With additional education and/or work experience, a graduate may find other opportunities for employment.

- Civil Engineer
- Construction Superintendent
- Building Inspector
- Civil Designer
- Construction Project Manager
- Surveyor

The Civil Engineering Technology program at NWTC is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700.

Some four-year colleges accept credits from the program for students wishing to pursue baccalaureate degrees in related fields.

CURRICULUM

The Civil Engineering Technology- Associate Degree is a two-year plus one summer, five-semester program. Upon graduation, a student will have completed 72 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-606-112	Engineering Applications	1
10-606-113	CAD	2
10-607-119	Civil Drafting Technology	2
10-607-121	Surveying/Mapping	3
10-607-128	Soil Mechanics	3
10-804-131	Math-Algebra/Inter	3
10-806-150	Physics 1-Technical	3
SEMESTER TOTAL		17

SECOND SEMESTER

10-607-102	Land Surveying/Computer Appl	1
10-607-111	Cemented Aggregate Mixtures	3
10-607-125	Civil Public Works Construct	2
10-801-195	Communication-Written	3
10-804-132	Math-Geometry/Analytic	3
10-806-160	Physics 2-Technical	3
10-809-197	Society-Amer Contemp	3
SEMESTER TOTAL		18

THIRD SEMESTER

10-607-131	Surveying 2	4
10-607-134	Surveying-Drafting	3
10-607-135	Statics/Strength Matl-Civil	4
10-801-196	Oral/Interpers Communication	3
10-804-170	Math 3-Tech Calculus	4
SEMESTER TOTAL		18

FOURTH SEMESTER

10-607-147	Water Technology	3
10-607-150	Land Surveying Law	2
	OR	
10-607-151	Highway Surveying	2
	OR	
10-607-152	Construction Meth/Bldg Syst	2
	OR	
10-607-153	Global Positioning Systems	2
10-801-197	Reporting-Technical	3
10-809-199	Psychology-Human Rel	3
	Elective	2
	Elective	2
	Elective	2
SEMESTER TOTAL		17

FIFTH SEMESTER

10-607-190	Civil Engineering Internshp	2
SEMESTER TOTAL		2

SUGGESTED ELECTIVES: Students should take 3 of the 4 following electives; Highway Surveying Technology (10-607-151), Global Positioning Systems (10-607-180), Land Surveying Law 2 (10-607-163), and Construction Methods and Building Systems (10-607-152).

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide the opportunity for the student to develop the knowledge, skills, and understanding of:

10-606-112 ENGINEERING APPLICATIONS

...basics of a computer system, computer terminology, Windows NT, Microsoft Word, Microsoft Excel, and AutoCAD.

10-606-113 CAD (COMPUTER AIDED DRAFTING)

...computer aided drafting using AutoCAD software focusing on template settings; creating and manipulating layers; basic drawing, editing, and inquiry commands; blocks and attributes; and plotting. (Corequisites: 10-606-112, Engineering Applications; 10-606-119, Sketching-Technical)

10-607-102 LAND SURVEYING/COMPUTER

APPL ...overview of Sokkia Map Vista mapping software for applications in land surveying for mapping, contouring and calculations.

10-607-111 CEMENTED AGGREGATE MIXTURES

...inspection/testing concepts, material sampling procedures, aggregate properties, Portland cement concrete mix design methods, hot mix asphalt design, field laboratory quality control testing. American Concrete Institute Grade I Field Testing Technician Certification is available through this course. (Prerequisite: 10-607-128, Soil Mechanics)

10-607-119 CIVIL DRAFTING TECHNOLOGY

...the architecture, engineering, and construction industry; fundamentals of drafting; measurement, scaling, and dimensioning; multi-view drawings; and design and construction print reading.

10-607-121 SURVEYING/MAPPING

...basic surveying principles, history of land, surveying, instruments in the field, making computations, and generating computerized maps. (Prerequisite: 10-804-130, Algebra/Trigonometry; Corequisite: 10-606-113, CAD)

10-607-125 CIVIL PUBLIC WORKS CONSTRUCT

...horizontal curves, sewer/water systems, civil engineering mapping, field inspector roles, and CAD applications. (Prerequisites: 10-606-113, Computer Aided Drafting; 10-607-121, Surveying and Mapping)

10-607-128 SOIL MECHANICS

...origins of soil, properties/characteristics of soil, soil classification systems, subsurface exploration, foundations, moisture-density relationships, soil compaction, and groundwater. Use and transportation of portable nuclear density gauges certification available. (Prerequisite: 10-804-130, Algebra/Trigonometry) Certification in the use and transfer of portable nuclear density gauges is available through this course.

10-607-131 SURVEYING 2

...closed traverse measurements, traverse adjustments, data collection, rectangular coordinate use, land area computation, public land subdivision, land descriptions, horizontal circular curve field layout/computation, and computer applications. (Prerequisite: 10-607-127, Public Works Construction)

10-607-134 SURVEYING DRAFTING

...survey tie drafting, survey map plat drawing, certified survey map drawing, subdivision/preliminary plat drawing, and basic use of AutoCAD and SOKKIA software in map preparation drawings. (Prerequisite: 10-607-131, Surveying 2)

10-607-135 STATICS/STRENGTH MATERIALS-

CIVIL ...force analysis, moments, resultant and equilibrant forces; coplanar, concurrent, and nonconcurrent systems; static friction; basic relationships of stress and strain under axial, torsional, and bending loads; properties of construction materials. (Prerequisite: 10-804-132, Geometry-Analytic; 10-806-150, Physics 1-Technical)

10-607-147 WATER TECHNOLOGY ...hydraulics, closed piping systems, open channel flow, sanitary/storm sewer systems, wastewater, hydrology, and water supply. (Prerequisites: 10-804-131, Algebra-Intermediate; 10-806-150, Physics 1-Tech)

10-607-150 LAND SURVEYING LAW

...history of property law, laws of evidence, unwritten rights, adverse possession, research and planning for a boundary survey, apportionment for land and water boundaries, and ethics of a land surveyor. (Prerequisite: 10-607-134, Surveying-Drafting)

10-607-151 HIGHWAY SURVEYING

TECHNOLOGY ...vertical curves, road design, volume calculations, site planning, astronomical observations, and construction staking. (Prerequisite: 10-607-131, Surveying 2)

10-607-152 CONSTRUCTION METHODS AND

BUILDING SYSTEMS ...building components, construction methods, construction materials, plans, specifications, and print reading. (Prerequisites: 10-607-111, Cemented Aggregate Mixtures; 10-607-127, Public Works Construction)

10-607-153 GLOBAL POSITIONING SYSTEMS

...introduction and history of GPS; latitude, longitude, and state plane coordinate systems; static, rapid static, and kinematic positioning systems. (Prerequisite: 10-607-131, Surveying 2)

10-607-190 CIVIL ENGINEERING INTERNSHIP

...the application of theory, skills, and techniques in the civil engineering profession.

Descriptions of courses not found on this page can be found in the back of the catalog.

Clinical Laboratory Technician

Program Code 105131

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5543. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

This program prepares learners to act as an entry level Clinical Laboratory Technician. The Clinical Laboratory Technician is a member of the health care team who provides clinical information for disease prevention, medical diagnosis, and treatment of the patient by processing specimens and performing laboratory tests by manual and automated methods. Clinical Laboratory Technicians may also have responsibilities for information processing, training, and quality control monitoring.

Graduates of the Clinical Laboratory Technician Program will be able to:

- Apply modern clinical methodologies including problem solving and trouble shooting according to predetermined criteria.
- Perform preventative and corrective maintenance of equipment and instruments according to predetermined criteria.
- Collect and process biological and other specimens.
- Perform and report results of clinical laboratory tests.
- Apply laboratory results to diagnosis of clinical conditions and/or diseases.
- Monitor and evaluate quality control in the laboratory.
- Practice laboratory safety and regulatory compliance.
- Communicate with colleagues and patients in a professional manner.
- Perform information processing in the clinical laboratory.
- Model professional behaviors, ethics, and appearance.

Students are required to purchase uniforms, provide their own transportation to clinical facilities, and pay for liability insurance for the Clinical Practicum course.

MATH LEVEL

Students should have mastered basic math skills and Accuplacer tests for algebra. For a description of basic math, see the Basic Education section of this catalog.

Wisconsin's Caregiver Law (1997 WISCONSIN ACT 27) requires a completed criminal background check prior to access to patients and/or children in clinical agencies/field sites used by this program. Based upon results of the criminal background check, a student may be denied access to clinical agencies/field sites and thus would not be able to complete the program. For the most current information on the Caregiver Law, visit this Web site: www.dhfs.state.wi.us

The Clinical Laboratory Technician program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)
8410 W. Bryn Mawr Ave., Suite 670
Chicago, IL 60631
(312) 714-8880

Graduates are qualified to take the Board of Registry examination from the American Society of Clinical Pathologists as well as the credentialing examination of the National Certification Agency for Laboratory Personnel.

EMPLOYMENT POTENTIAL

Most Clinical Laboratory Technicians work in hospitals or clinic labs. Some Clinical Laboratory Technicians may choose to work for veterinary laboratories, industrial labs, insurance companies, research facilities, environmental labs, or public health.

CLINICAL LABORATORY TECHNICIAN:

applies knowledge of test procedures and quality control methods in the areas of hematology, chemistry, serology, urinalysis, blood bank, microbiology, and phlebotomy; performs tests accurately and efficiently using both automated and manual methodology; evaluates the clinical significance of test results.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- Minimum standard composite score of 20 on the ACT assessment.
- High school diploma or equivalent.
- Two years of algebra or one year of algebra and one year of advanced math (or attain a minimum of 80% on the NWTC algebra examination).
- One year of biology or equivalent.
- One year of chemistry or equivalent. (All courses should have been completed with a C or better grade.)
- Have completed a medical examination satisfactorily within three months before entering program.
- Strongly recommend attendance in the Program Orientation session.
- All students are required to complete an American Heart Association Health Care Provider CPR course prior to Clinical Practicum. Students are required to maintain a current CPR card on a one-year renewal cycle to comply with affiliating agency requirements.

NOTE: Students who do not meet the above requirements should consult an NWTC counselor about ways to make up any deficiencies through testing or course work.

CURRICULUM

The Clinical Laboratory Technician Associate Degree is a two-year, five-semester program. Upon graduation, a student will have completed 72 credits.

FIRST SEMESTER

Course No.	Description	Credits
* 10-513-110	Basic Lab Skills	1
* 10-513-111	Phlebotomy	2
* 10-513-113	QA/Laboratory Math	1
* 10-513-115	Basic Immunology Concepts	2
10-801-196	Oral/Interpers Communication	3
* 10-806-193	Anatomy/Physiology-General	4
* 10-806-199	Chemistry-Organic & Biological	3
	Elective	1
	SEMESTER TOTAL	17

SECOND SEMESTER

* 10-513-114	Urinalysis	2
* 10-513-120	Basic Hematology	3
* 10-513-121	Coagulation	1
* 10-513-122	Introduction to Blood Bank	2
* 10-513-123	Advanced Blood Bank	2
10-801-195	Communication-Written	3
* 10-806-197	Microbiology	4
	Elective	1
	SEMESTER TOTAL	18

THIRD SEMESTER

10-809-195	Economics	3
10-809-196	Sociology-Intro	3
	Elective	1
	SEMESTER TOTAL	7

FOURTH SEMESTER

* 10-513-130	Advanced Hematology	2
* 10-513-131	Intro-Clinic Chem Diagnostics	3
* 10-513-132	Adv Clinic Chem Diagnostics	2
* 10-513-133	Clinical Microbiology	4
10-809-198	Psychology-Intro	3
	Elective	3
	SEMESTER TOTAL	17

FIFTH SEMESTER

* 10-513-140	Adv Topics in Microbiology	2
* 10-513-161	Clinical Lab-Practicum 1	5
* 10-513-162	Clinical Lab-Practicum 2	3
* 10-513-163	Clinical Lab-Practicum 3	3
	SEMESTER TOTAL	13

NOTE: * No final grade lower than C is acceptable in any of the courses marked with an asterisk. A student must repeat that particular course to achieve a C or better final grade in order to continue in or graduate from this program. If the course is segmented, the successful retake must occur before continuing the sequence.

SUGGESTED ELECTIVES: Computer Applications (10-103-104), Keyboarding (10-106-145), Medical Terminology (10-510-165).

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-513-110 BASIC LAB SKILLS ...explores health career options and the fundamental principles and procedures performed in the clinical laboratory. Learners will utilize medical terminology and basic laboratory equipment. Learners will follow required safety and infection control procedures and perform simple laboratory tests.

10-513-111 PHLEBOTOMY ...this course provides opportunities for learners to perform routine venipuncture, routine capillary puncture, and special collection procedures. (Prerequisite: 10-513-110, Basic Lab Skills)

10-513-113 QA/LABORATORY MATH ...focuses on performing the mathematical calculations routinely used in laboratory settings. Learners will explore the concepts of quality control and quality assurance in the laboratory. Learners will review regulatory compliance requirements, and certification and continuing education programs. (Prerequisite: High School chemistry or equivalent)

10-513-114 URINALYSIS ...prepares learners to perform a complete urinalysis which includes physical, chemical, and microscopic analysis. Learners will explore renal physiology and correlate urinalysis results with clinical conditions. (Prerequisites: 10-513-110, Basic Lab Skills and 10-513-113, QA/Lab Math)

10-513-115 BASIC IMMUNOLOGY CONCEPTS ...provides an overview of the immune system including laboratory testing methods for diagnosis of immune system disorders, viral, and bacterial infections. (Prerequisite: Accepted into Clinical Laboratory Technician)

10-513-120 BASIC HEMATOLOGY ...covers the theory and principles of blood cell production and function, and introduces the learner to basic practices and procedures in the hematology laboratory. (Prerequisites: 10-513-110, Basic Lab Skills; 10-513-113, QA/Lab Math; 10-513-111, Phlebotomy; 10-513-115, Basic Immunology Concepts)

10-513-121 COAGULATION ...introduces the theory and principles of coagulation and explores mechanisms involved in coagulation disorders. Emphasis is placed upon laboratory techniques used to diagnose disease and monitor treatment. (Prerequisites: 10-513-110, Basic Lab Skills; 10-513-113, QA/Lab Math; 10-513-115, Basic Immunology Concepts; 10-513-120, Basic Hematology; 10-513-111, Phlebotomy)

10-513-122 INTRODUCTION TO BLOOD BANK ...introduces basic blood banking concepts and procedures including blood typing and compatibility testing. (Prerequisites: 10-513-110, Basic Lab Skills; 10-513-113, QA/Lab Math; 10-513-115, Basic Immunology Concepts)

10-513-123 ADVANCED BLOOD BANK ...focuses on advanced blood banking concepts and procedures including work ups for adverse reaction to transfusions and disease states. (Prerequisite: 10-513-122, Introduction to Blood Bank)

10-513-130 ADVANCED HEMATOLOGY ...explores mechanisms involved in the development of hematological disorders. Emphasis is placed upon laboratory techniques used to diagnose disorders and monitor treatment. (Prerequisite: 10-513-120, Basic Hematology)

10-513-131 INTRODUCTION TO CLINIC CHEMISTRY DIAGNOSTICS ...introduces Clinical Chemistry techniques and procedures for routine analysis using photometric, potentiometric, and separation techniques. Topics in this course include pathophysiology and methodologies for carbohydrate, lipoids, proteins, renal function, and blood gas analysis. (Prerequisites: 10-513-110, Basic Lab Skills; 10-513-113, QA/Lab Math; 10-806-193, Anatomy/Physiology-General; 10-513-114, Urinalysis; 10-806-199, Chemistry-Organic & Biological)

10-513-132 ADVANCED CLINICAL CHEMISTRY DIAGNOSTICS ...a continuation of Clinical Chemistry Diagnostics, techniques, and procedures for analysis using sophisticated laboratory instrumentation. Topics include pathophysiology and methodologies for hepatic, bone, cardiac markers, tumor markers, endocrine function, fetal function, miscellaneous body fluids, and toxicology. (Prerequisite: 10-513-131, Introduction to Clinical Chemistry Diagnostics)

10-513-133 CLINICAL MICROBIOLOGY ...presents the clinical importance of infectious diseases with emphasis upon the appropriate collection, handling and identification of clinically relevant bacteria. Disease states, modes of transmission and methods of prevention and control, including antibiotic susceptibility testing, are also discussed. (Prerequisites: 10-806-197, Microbiology; 10-513-110, Basic Lab Skills)

10-513-140 ADVANCED TOPICS IN MICROBIOLOGY ...overview of acid fast organisms, fungi, parasites, and anaerobic bacteria. The organisms, their pathophysiology, epidemiology, the diseases and conditions that they cause, laboratory methods of handling, culturing, and identification will be discussed. (Prerequisite: 10-513-133, Clinical Microbiology)

10-513-161 MEDICAL LAB-PRACTICUM ...clinical applications of knowledge and procedures in hematology/coagulation, urinalysis, microbiology, blood bank, chemistry/serology, preparation for MLT certification examinations. (Corequisites: 10-513-162, Clinical Lab-Practicum 2; 10-513-163, Clinical Lab-Practicum 3)

10-513-162 MEDICAL LAB-PRACTICUM ...clinical applications of knowledge and procedures in hematology/coagulation, urinalysis, microbiology, blood bank, chemistry/serology, preparation for MLT certification examinations. (Corequisites: 10-513-161, Clinical Lab-Practicum 1 and 10-513-163, Clinical Lab-Practicum 3)

10-513-163 MEDICAL LAB-PRACTICUM ...clinical applications of knowledge and procedures in hematology/coagulation, urinalysis, microbiology, blood bank, chemistry/serology, preparation for MLT certification examinations. (Corequisites: 10-513-161, Clinical Lab-Practicum 1 and 10-513-162, Clinical Lab-Practicum 2)

Descriptions of courses not found on this page can be found in the back of the catalog.

Computer Numeric Control (CNC) Technician

Program Code 324441

TECHNICAL DIPLOMA - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5543. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

A second year of advanced CNC (Computer Numeric Control) machining for graduates of the Machine Tool Operation program.

Graduates of the Computer Numeric Control Technician Program will be able to:

- Control multiple axis CNC machines.
- Use efficient production set up techniques.
- Use advanced CNC programming techniques.
- Control optional features on CNC machines.
- Design and construct jigs and fixtures.
- Program 3-D surface machining operations.
- Use precision measuring practices.

PROFILE OF INCOMING STUDENTS

- Like to work with numbers
- Accurate with numbers
- Problem solver
- Critical thinker
- Like to organize information
- Able to work with and meet deadlines

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Equivalency may be established through GED testing or other tests.)

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as a Computer Numerical Controlled (CNC) Operator, Jig and Fixture Apprentice/Trainee, Machinist Apprentice/Trainee, and Manufacturing Engineering Technician.

CNC TECHNICIAN/PROGRAMMER

OPERATOR: sets up and operates computer numerical controlled machine tools working from blueprints and set-up sheets; sets up fixturing and tooling; produces and inspects parts; and edits CNC programs on CNC lathes and machining centers.

JIG AND FIXTURE APPRENTICE/TRAINEE: lays out, fits, and assembles parts to make and repair cutting tools, jigs, fixtures, gauges, or machinist's hand tools by analyzing specifications.

MACHINIST APPRENTICE/TRAINEE: sets up and operates a variety of machine tools; and fits and assembles parts to fabricate or repair machine tools and to maintain industrial machines.

MANUFACTURING ENGINEERING

TECHNICIAN: supports production in a CNC machining environment.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Journey Level Machinist
- Pattern Maker
- Mold Maker
- Tool and Die Maker
- CNC Programmer
- Machine Shop Foreperson/Supervisor

CURRICULUM

The CNC Technician Technical Diploma is a two-year, four-semester program. Upon graduation, a student will have completed 68 credits.

FIRST SEMESTER

Course No.	Description	Credits
31-420-304	CNC Fundamentals 1	3
31-420-345	Machine Shop 1	4
31-420-346	Machine Shop 2	4
31-420-348	Precision Measurement	1
31-420-358	CNC Set-Ups	1
31-421-352	Blueprint Rdg/Sket-Mach 1	2
31-804-301	Math 1-Trades	2
SEMESTER TOTAL		17

SECOND SEMESTER

31-420-347	Cutting Tool Technology	1
31-420-349	CNC Fundamentals 2	3
31-420-356	Machine Shop 3	4
31-420-357	Machine Shop 4	4
31-421-362	Blueprint Rdg/Sket-Mach 2	2
31-422-359	Metallurgy for Machinist	1
31-801-386	Communicating Effectively	1
31-804-302	Math 2-Trades	1
SEMESTER TOTAL		17

THIRD SEMESTER

31-442-350	Welding-Machine Trades	2
31-804-303	Math 3-Trades	1
32-420-301	Tool Making	4
32-420-303	Tooling Design	2
32-420-332	CNC Fundamentals 3	2
32-420-335	CNC Turning Operation	3
32-420-336	CNC Machining Center Oper	3
SEMESTER TOTAL		17

FOURTH SEMESTER

31-809-301	Social Science Survey	2
32-420-305	Machine Applications-Advanced	4
32-420-307	Machining Theory-Advanced	2
32-420-308	Metrology	1
32-420-342	CNC Fundamentals 4	2
32-420-346	CNC Techniques 1-Advanced	3
32-420-347	CNC Techniques 2-Advanced	3
SEMESTER TOTAL		17

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

31-420-304 CNC FUNDAMENTALS 1 ...computer controlled milling machines, basic programming operations on computer aided manufacturing (CAM) systems, and fundamental programming of computer numerically controlled (CNC) milling machines.

31-420-345 MACHINE SHOP 1 ...shop safety, measuring tools/layout, power saw theory/operation, basic theory/operation of drilling machines, bench work, basic engine lathe operation, basic vertical, horizontal, CNC milling machine, surface grinder.

31-420-346 MACHINE SHOP 2 ...safety, measuring tools/layout, power saw operation, drilling machine operation basic/theory and operation of engine lathes, basic theory/operation vertical/horizontal milling machines; CNC milling, lathe operation, surface grinder operations.

31-420-347 CUTTING TOOL TECHNOLOGY ...tool materials, tool geometry, lathe tools, milling cutters, cutting speeds/feeds, drills, reamers, taps, threading tools, carbide inserts, and diamond, ceramic, Cermet and polycrystalline cutting tools.

31-420-348 PRECISION MEASUREMENT ...how to read/measure english and metric, rules, squares surface plates, micrometers, vernier calipers, height measuring instruments, gage blocks, angular measurement, go-no-go gages, comparison measurement; surface finish measurement.

31-420-349 CNC FUNDAMENTALS 2 ...computer controlled milling machines, basic programming operations on computer aided manufacturing (CAM) systems, fundamental programming of computer numerically controlled (CNC) milling machines, and CNC turning centers.

31-420-356 MACHINE SHOP 3 ...shop safety, measuring tools/layout, power saws, drilling machine operation, intermediate engine lathed operation and vertical horizontal, CNC milling machine operation, theory/operating grinding machines, operating CNC turning centers.

31-420-357 MACHINE SHOP 4 ...shop safety, measuring tools, power saw operation, drilling machines, bench work and maintenance, advanced engine lathe operation, advanced vertical horizontal and CNC milling operation, grinding machine operation, and CNC turning centers.

31-420-358 CNC SET-UPS ...CNC mill and lathe-tool holder selection, loading and unloading tools, work holding, setting part zero, fixture offsets, setting length and dial offsets, boring bars, and bar feeding.

31-421-352 BLUEPRINT READING/SKETCHING-MACHINE 1 ...fundamentals of sketching, orthographic projection, auxiliary views, sectional views, dimensioning, precision and non-precision measurement, and general print reading.

31-421-362 BLUEPRINT READING/SKETCHING-MACHINE TRADES 2 ...blueprint reading, tolerancing, surface finishes, fits (inch & metric), basic welding symbols, casting, stamping, gearing and CAM drawings, and basic geometric tolerancing and dimensioning. (Prerequisite: 31-421-352, Blueprint Reading Sketching-Machine Trades I)

31-422-359 METALLURGY FOR MACHINIST ...manufacture of iron and steel, basic composition of metals, metal identification, applied heat treating processes.

31-442-350 WELDING-MACHINE TRADES ...oxyacetylene welding, brazing, soldering; cutting, hardsurfacing, out-of-position welding, arc welding of machines/accessories, running beads, types of joints, welding thin gauge, arc cutting, and heating.

32-420-301 TOOL MAKING ...performing various machining, heat-treating, and assembly operations necessary to produce a tool or fixture to be used in a typical manufacturing process.

32-420-303 TOOLING DESIGN ...interpreting tool and fixturing prints, designing a tool or fixture to be used in a typical manufacturing process.

32-420-305 MACHINE APPLICATIONS-ADVANCED ...maintain/set-up/operate CNC wire/RAM EDM machines, simulate high-speed machining processes, apply superabrasive tooling, 4th axis milling operations, 3 axis turn/mill/drill applications, 3-D surface machining.

32-420-307 MACHINING THEORY-ADVANCED ...electrical discharge machining (EDM), high speed machining concepts, rapid setup and quick change over procedures, abrasive waterjet, abrasive flow, chemical machining, laser and plasma, palletizing systems.

32-420-308 METROLOGY ...ISO 9000 concepts, Statistical Process Control (SPC) theory and applications, coordinate measuring machine setup and applications, surface texture measurement concepts, and applications for geometric dimensioning and tolerancing (GD&T), optical comparator and high amplification techniques.

32-420-332 CNC FUNDAMENTALS 3 ...CNC production planning, advanced 2-D mill programming, 3-D surface programming for CNC milling, conversational and G-code programming for milling machines, and computer assisted CNC programming for milling operations. (Prerequisites: 31-420-320, CNC Theory 2; 31-420-321, CNC Practice 2)

32-420-335 CNC TURNING OPERATION ...equipment overview, production planning, machine start-up, control panel operations, CNC control tools, operational codes and functions, operation modes and CNC code generation. (Prerequisite: satisfactory completion of the Machine Tool Operations program)

32-420-336 CNC MACHINING CENTER OPERATION ...equipment overview, production planning, machine start-up, control panel operations, CNC control tools, operational codes and functions, operation modes and CNC code generation. (Prerequisite: satisfactory completion of the Machine Tool Operations program)

32-420-342 CNC FUNDAMENTALS 4 ...CNC process modeling, 4th axis indexing, advanced CNC lathe programming, 4th axis CNC wire EDM programming, and CNC fabrication punch/burner programming applications. (Prerequisite: 32-420-332, CNC Fundamentals 3)

32-420-346 CNC TECHNIQUES 1-ADVANCED ...workholding, cutting tools, and toolholders; productivity improvement; programmable tailstock operation; bar feeder operation; live tooling and c-axis control; advanced programming techniques. (Prerequisite: satisfactory completion of the Machine Tool Operations program)

32-420-347 CNC TECHNIQUES 2-ADVANCED ...special CNC control techniques, use of canned cycles, special programming functions, 3D surface machining, production machining. (Prerequisite: satisfactory completion of the Machine Tool Operations program)

Descriptions of courses not found on this page can be found in the back of the catalog.

Criminal Justice - Corrections

Program Code 105042

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5543. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Students relate theory to current practice trends, problems, and issues. Criminal justice students study correctional counseling, sociology, and security.

Graduates of the Criminal Justice - Corrections Program will be able to:

- Analyze security procedures.
 - Exercise interviewing techniques.
 - Examine the state and federal court structure.
 - Apply restraints.
 - Outline the juvenile and adult criminal justice system.
 - Prepare reports.
 - Interpret correctional law.
 - Summarize probation and parole procedures.
 - Demonstrate oral communication skills.
 - Compare numerous theories of criminal behavior.
 - Contrast various components of the criminal justice system.
 - Distinguish numerous functions of community corrections.
 - Identify the components that comprise corrections.
 - Summarize the administrative and managerial functions within the correctional system.
 - Be eligible to become a state certified juvenile detention officer.
 - Be eligible to become a state certified jail officer.
 - Apply basic math skills.
 - Demonstrate keyboarding and computer skills.
- STUDENTS SEEKING CERTIFICATION CAN ALSO:**
- Apply principles of subject control.
 - Implement jail fire safety.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent
- Good writing and communication skills
- Strong organizational skills

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of this program will have the potential for employment as a Correctional Officer, Youth Care Worker, and Detention Worker.

CORRECTIONAL OFFICER: monitors, supervises, and informally counsels inmates under his/her control; works cooperatively with other correctional staff; maintains order within the facility; enforces rules and regulations; searches inmates for contraband items such as weapons or drugs; transports inmates; mediates disputes between inmates; enforces discipline; and reports verbally and in writing about inmate conduct and the quality and quantity of work done by inmates.

YOUTH CARE WORKER: monitors the whereabouts and activities of clients under his/her responsibility, informally counsels, and guides proper personality development of clients.

DETENTION WORKER: oversees and monitors juveniles within a secure detention facility, maintains order within the setting, cooperates with staff and law enforcement personnel, is responsible for oral and written communications with a variety of agencies, and is knowledgeable about federal and state laws concerning juvenile rights.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Adult/Juvenile Administrator
- Institutional Case Worker/Social Worker
- Probation/Parole Agent
- Youth Counselor/Case Aide
- Youth Detention Home Supervisor

NOTE: Students should be aware that a previous criminal record will limit their opportunity to gain successful entry-level employment.

CURRICULUM

The Criminal Justice - Corrections Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 67 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-106-145	Keyboarding	1
10-504-114	Police-Nutrition/Fitness	1
10-504-116	Criminal Justice-Intro	3
10-504-122	Correctional Admin	3
10-504-155	Corrections-Community	3
10-801-196	Oral/Interpers Communication	3
10-809-199	Psychology-Human Rel	3
SEMESTER TOTAL		17

SECOND SEMESTER

10-504-123	Correctional Inst	3
10-504-133	Correctional Sociology	3
10-504-172	Criminology	3
10-801-195	Communication-Written	3
10-804-152	Math-Protective Services	3
10-809-197	Society-Amer Contemp	3
SEMESTER TOTAL		18

THIRD SEMESTER

10-103-102	Microsoft Off-Word/Access	2
10-504-129	Correctional Interviewing	3
10-504-132	Courts/Jurisdiction	3
10-801-172	Writing-Criminal Justice	3
10-801-198	Speech	3
	Elective	3
SEMESTER TOTAL		17

FOURTH SEMESTER

10-504-145	Corrections Law	3
10-504-146	Probation/Parole	3
10-504-147	Correctional Security	3
10-504-154	Youth-Chng Community	3
	Elective	3
SEMESTER TOTAL		15

SUGGESTED ELECTIVES: Narcotics and Vice Investigation (10-504-151), Corrections Internship (10-504-171).

Electives required for State certification are: Principles of Subject Control (POSC) Training (10-504-188) and Jail Health Care & Fire Safety (10-504-179).

A student must successfully complete 15 credits from the program before he/she is eligible to take the following certification requirement courses: Principles of Subject Control (10-504-178) and Jail Health Care & Fire Safety (10-504-179).

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-504-114 POLICE-NUTRITION/FITNESS

...the course will provide an introduction to nutrition and eating correctly for maximum value. Also, an introduction to fitness for a criminal justice professional.

10-504-122 CORRECTIONAL ADMINISTRATION

...chain of command, roles of the correctional supervisor, administrative structures, current management practices and problems, personnel needs, organizational theories, mission goals, policy making, inmate discipline, and report writing.

10-504-123 CORRECTIONAL INSTITUTION

...the evolution of punishment, development of prisons, southern penal systems, the "Big House" era, prisoner movement, inmate groups, special offender groups, the female offender, prison programs, prison services.

10-504-129 CORRECTIONAL INTERVIEWING

...process of correctional interviewing using basic skills model; use of nonverbal and verbal communication; securing admissible confessions that preserve individual's constitutional rights; ethics in criminal justice interviewing.

10-504-132 COURTS/JURISDICTIONS

...development of the American judicial system, the Federal and Wisconsin court structure, Wisconsin judicial rules and procedures from complaint to sentencing as they impact police or correctional officers.

10-504-133 CORRECTIONAL SOCIOLOGY

...inmate adjustment process, informal organizations, responsibilities of a correctional officer, adult/juvenile admission processes, supervision of "special" inmates, suicide prevention, juvenile detention operations, juvenile release processes, and stress.

10-504-145 CORRECTIONS LAW ...laws, rules, and standards affecting jails, Federal and State Court systems, criminal and civil actions, criminal sentences, plea bargaining, community-based sanctions, sentencing statutes and guidelines, prisoner rights, and inmate litigation.

10-504-146 PROBATION/PAROLE ...criminal justice system, probation and parole, types of offenses, sentencing process, presentence investigation, revocation procedures, alternatives to incarceration, parole board functions, Parole Officer responsibilities, and guidelines for releasing inmates.

10-504-147 CORRECTIONAL SECURITY ...inmate security control, inspections, movements, counts; resident protection, privacy, safety, searches, contraband, restraints, equipment; building security; detection devices; legal aspects; personnel protection; building clearing; hostage negotiations; and pad subduing techniques.

10-504-154 YOUTH-CHANGING COMMUNITY

...juvenile delinquency; historical development controlling children, gangs, family, endangered children; legal requirements of handling juveniles; discipline of juveniles; supervision of juveniles; and community-based programs.

10-504-155 CORRECTIONS-COMMUNITY

...criminal justice system stages, community-based corrections, diversion programs, pre-trial release programs, restitution, community service, temporary release programs, halfway houses, female offenders, drug and alcohol abusing offenders, and juvenile programs.

10-504-172 CRIMINOLOGY ...nature, extent, and distribution of crime in the United States; biological, psychological, and sociological aspects of crime causation; and legal and political implications of crime prevention and control.

Descriptions of courses not found on this page can be found in the back of the catalog.

Criminal Justice - Law Enforcement

Program Code 105041

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counsel, (920) 498-5733. Course information (920) 498-5543. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Criminal Justice - Law Enforcement students study the law enforcement field plus physical and behavioral sciences to meet the demands of the police profession, including criminal investigation, traffic law, patrol procedures, and scientific crime laboratory.

Graduates of the Criminal Justice-Law Enforcement Program will be able to:

- Qualify for entry level positions in protective services.
- Write reports.
- Apply courtroom testimony techniques.
- Demonstrate knowledge of laws and principles of arrest, search, and seizure.
- Demonstrate understanding of relevant state statutes.
- Interpret selected theories of criminal behavior.
- Describe the structure and procedures of the court system.
- Describe the structure and procedures of the police organization.
- Describe the structure and procedures of corrections.
- Describe the structure and procedures of the juvenile system.
- Investigate an accident.
- Interview suspects and witnesses.
- Process a crime scene.
- Apply investigative techniques.
- Contrast the various police community relations programs.
- Make appropriate judgments on risk and other factors of police situations.
- Describe various patrol tactics.
- Contrast major social institutions within American society.
- Demonstrate effective communication skills.
- Apply basic math skills.
- Demonstrate basic computer skills.
- Students seeking certification can also:
 - Operate vehicles in emergency situations.
 - Demonstrate arrest, search, and seizure.

REQUIREMENT FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent
- Good writing and communication skills
- Strong organizational skills

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

Wisconsin Training and Standards requires a completed criminal background check in order to successfully complete certifiability for training standards. Based upon results of the criminal background check, a student may be denied enrollment in some courses.

EMPLOYMENT POTENTIAL

A graduate of this program will have the potential for employment as a Police Officer, Deputy Sheriff, DNR Officer, State Trooper, Military Law Enforcement Officer, Private Investigator, Security Guard, or Correctional Officer.

POLICE OFFICER: performs general traffic and law enforcement duties at the municipal level.

DEPUTY SHERIFF: performs general traffic and law enforcement duties, jailer, and telecommunications responsibilities at the county level.

DNR OFFICER: enforces fish, game, forest, and environmental laws at the state level.

STATE TROOPER: performs traffic and law enforcement duties at the state level.

MILITARY LAW ENFORCEMENT OFFICER: performs criminal investigations, is responsible for traffic assignments, patrol, and general law enforcement duties in any branch of the military service at installations, forts, and bases.

PRIVATE INVESTIGATOR: conducts criminal and non-criminal investigations for private businesses and industry.

SECURITY GUARD: patrols and investigates for retail business and private industrial plants.

CORRECTIONAL OFFICER: is assigned to security and general duties in a correctional institution.

With additional education and/or work experience, Graduates may find other opportunities for employment.

- Police Administrator
- Chief Deputy
- State Agent
- Federal Agent

NOTE: A student must successfully complete 30 credits of specific courses within the program before being eligible to take the following certification requirement course: Defensive & Arrest Tactics (10-504-175).

A student must successfully complete 30 credits of specific courses within the program before being eligible to take the following certification requirement courses: Firearms (10-504-177) and EVOC/First Responder (10-504-174).

NOTE: DAAT is not a necessary pre-requisite for EVOC. Must have 30 transcribed credits.

CURRICULUM

The Criminal Justice - Law Enforcement Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 69 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-106-145	Keyboarding	1
10-504-114	Police-Nutrition/Fitness	1
10-504-116	Criminal Justice-Intro	3
10-504-131	Professional Communication	3
10-504-132	Courts/Jurisdiction	3
10-801-196	Oral/Interpers Communication	3
10-804-152	Math-Protective Services	3
SEMESTER TOTAL		17

SECOND SEMESTER

10-103-102	Microsoft Off-Word/Access	2
10-504-142	Constitutional Law	3
10-504-144	Community Police Strategies	3
10-801-195	Communication-Written	3
10-801-198	Speech	3
10-809-199	Psychology-Human Rel	3
SEMESTER TOTAL		17

THIRD SEMESTER

10-504-112	Traffic Theory	3
10-504-120	Criminal Law	3
10-504-140	Criminal Investigation	3
10-801-172	Writing-Criminal Justice	3
10-806-151	Science-Police Elective	3
SEMESTER TOTAL		18

FOURTH SEMESTER

10-504-121	Traffic Application	3
10-504-143	Forensic Application	3
10-504-170	Juvenile Law	3
10-504-174	Emergency Medical	2
10-809-197	Society-Amer Contemp Elective	3
SEMESTER TOTAL		17

SUGGESTED ELECTIVES: Defense/Arrest Tactics (10-504-173), Firearms Training (10-504-180), Police Traffic Radar (10-504-182), Law Enforcement Scenario (10-504-113).

This program is fully eligible for financial aid.

All Corrections Science core courses are also recommended electives. Electives required for State certification are: 1) Emergency Medical (10-504-174), 2) Defense & Arrest Tactics (DAAT) Training (10-504-175), and 3) Firearms Training (10-504-177).

NOTE: A Department of Justice, Law Enforcement Standards Board directive requires that a successful, negative drug test be completed prior to the first enrollment in any of the series of courses necessary for Law Enforcement Officer Certification. Those courses are: 1) Emergency Medical (10-504-174), 2) Defense & Arrest Tactics Training (10-504-175), and 3) Firearm Training (10-504-177).

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-504-112 TRAFFIC THEORY ...types of patrol and philosophy, concepts, and functions; types of calls and procedures; information gathering and reporting; patrol responsibility at crime scenes; courtroom procedures; and community relations.

10-504-114 POLICE-NUTRITION/FITNESS ...the course will provide an introduction to nutrition and eating correctly for maximum value. Also, an introduction to fitness for a criminal justice professional.

10-504-116 CRIMINAL JUSTICE-INTRODUCTION ...criminal justice, crime picture, criminal law, theories of crime, history of policing, police management, legal aspects, courts, corrections, correction facilities.

10-504-120 CRIMINAL LAW ...criminal law characteristics; terminology, history, principles, and philosophy of criminal law; use of the Wisconsin Statute Book; and examination of selected criminal offenses and identifying elements.

10-504-121 TRAFFIC APPLICATION ...fundamentals of evaluating the traffic law; process of issuing traffic citations and investigating and completing traffic accident reports; the process for safe traffic stops: low and high risk.

10-504-131 PROFESSIONAL COMMUNICATION ...process of criminal justice interviewing using basic skills model; use of nonverbal and verbal communication; security admissible confessions that preserve individual's constitutional rights; ethics in criminal justice interviewing.

10-504-132 COURTS/JURISDICTIONS ...development of the American judicial system, the Federal and Wisconsin court structure, Wisconsin judicial rules and procedures from complaint to sentencing as they impact police or correctional officers.

10-504-140 CRIMINAL INVESTIGATION ...principles of criminal investigation; focus on techniques of an investigation from the preliminary investigation interview, evidence procedures, and specific crime investigation.

10-504-142 CONSTITUTIONAL LAW ...arrest and search and seizure of persons, places, and things with or without warrant; cause and procedure to obtain and execute warrants; exclusionary rule and effects of illegal actions.

10-504-143 FORENSIC APPLICATION ...processing of crime scenes and use of forensic science in criminal investigations; emphasis on collection, preservation, and court presentation of fingerprint, firearm, impression, trace, body fluid, and document evidence. (Prerequisite: 10-504-140, Criminal Investigation)

10-504-144 COMMUNITY POLICE STRATEGIES ...history of community policing, community, police, problem-solving policing, interpersonal skills, diversity, citizens with disabilities, elderly, youth, gangs, victims/witnesses, media, and community police programs.

10-504-170 JUVENILE LAW ...as it relates to the field officer and the application of the law as it relates to juveniles in these situations.

10-504-174 EMERGENCY MEDICAL ...emergency patrol vehicle use and emergency first aid at the scene.

Descriptions of courses not found on this page can be found in the back of the catalog.

Dental Assistant Program Code 315081

TECHNICAL DIPLOMA - ONE YEAR

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5543. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

The Dental Assistant program trains students to prepare patients for treatment, sterilize instruments, and assist the dentist at chariside.

Graduates of the Dental Assistant Program will be able to:

- Assist with chairside procedures.
- Manipulate dental materials.
- Perform laboratory duties.
- Execute infection control/universal precaution techniques.
- Prepare to treat various dental patients.
- Perform Radiographic/Imaging Techniques/Processing.
- Maintain inventory.
- Perform receptionist/front office duties.
- Maintain dental equipment.

Students will be required to purchase personal protection equipment/clothes, pay for liability insurance for dental clinical experience courses, provide their own transportation to the dental office, and attend a two-day dental convention in Chicago or Milwaukee.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- An acceptable level on required entrance tests
- High school diploma or equivalency or youth option student
- Computer or keyboarding skills
- Medical and dental examinations satisfactorily completed before entering the program
- A science background with emphasis in advanced biology and anatomy and physiology is desirable
- Medical and dental examinations must be satisfactorily completed prior to entering second semester

Students are required to complete the American Heart Association Health Care Provider CPR Course scheduled prior to the Dental Health Safety course. Hepatitis vaccination is required prior to first clinic course.

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

The program prepares graduates to work with dentists as they examine and treat patients. Dental assistants with documented skills also may carry out a variety of laboratory, clinical, and office duties. Some dental assistants manage the office and are responsible for patient scheduling and bookkeeping functions. Most dental assistants work in general or specialty dental offices, either for individual dentists or for groups of dentists. Some dental assistants may choose to work for insurance companies, dental lab studios, or dental supply companies. The dental assistant may also find employment with federal agencies such as the Veterans' Administration, US Public Health Services, the Armed Forces, or a state, county, or city health facility.

Graduates may find employment as a:

- Dental Assistant
- Dental Office Manager
- Dental Laboratory Assistant
- Dental Laboratory Technician
- Dental Treatment Coordinator
- Maxillofacial Dental Assistant
- Endodontic Dental Assistant
- Prosthodontic Dental Assistant
- Dental Receptionist
- Dental Practice Manager
- Dental Sales Representative
- Orthodontic Dental Assistant
- Pediatric Dental Assistant
- Periodontic Dental Assistant

SCHOLARSHIPS: The Brown-Door-Kewaunee Dental Society, the Northeast Wisconsin Dental Assistant Association, and the NWTC Dental Assistant Program offer four scholarships: (2) \$500.00, (1) \$225.00, and (1) \$150.00, to students in the Dental Assistant program. Criteria include financial need, grade point average, and attendance. NWTC also has other scholarships available to students.

CURRICULUM

The Dental Assistant Technical Diploma is a one-year, three-semester program. Upon graduation, a student will have completed 31 credits.

The 2nd and 3rd semesters are 14 weeks on campus and 3 weeks off campus for clinical.

INTRODUCTORY SEMESTER

A non-traditional semester offered in June, August and January to students accepted into the Dental Assistant program and high school seniors applying to the Dental Assistant program.

Course No.	Description	Credits
31-508-309	Dental/Pers Relationship	1
31-508-325	Dental Asst Clin Infect Ctrl	1
31-508-328	Dental Office Med Emergency	1
SEMESTER TOTAL		3

FIRST SEMESTER

31-508-310	Dental Science-Biomedical	2
31-508-311	Dental Asst 1-Chairside	4
31-508-312	Dental Materials	4
31-508-313	Radiography 1-Dental Asst	2
31-508-318	Dental Clinic Exp 1	2
SEMESTER TOTAL		14

SECOND SEMESTER

31-105-303	Dental Office Mgmt	1
31-508-322	Dental Clinic Exp 2	2
31-508-324	Dental Lab Procedures	3
31-508-326	Dental Asst 2-Chairside	4
31-508-329	Radiography 2-Dental Asst	2
SEMESTER TOTAL		12

May be taken at any time prior to graduation.

31-801-385	Communicating-Writing	1
31-801-386	Communicating-Interpers	1
TOTAL		2

NOTE: Students must have a C average to graduate from the Dental Assistant Program. Students who do not meet this requirement would have to repeat courses with a below C grade to graduate.

CERTIFICATION: Graduates of the program are eligible to take the national certification offered by the Dental Assisting National Board (DANB), (312) 642-3368. The Dental Assistant program is accredited by the American Dental Association-Commission on Dental Accreditation.

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

31-105-303 DENTAL OFFICE MANAGEMENT

...uses of a dental computer program, appointment control, records management, recall programs, fees, payment plans, collections, and insurance.

31-508-309 DENTAL/PERSONAL

RELATIONSHIPS ...history, the dental team, ethics, jurisprudence, risk management, nutrition, and personal improvement; psychology of management skills; and the importance of working as a team.

31-508-310 DENTAL SCIENCE-BIOMEDICAL

...immunology, oral embryology, various pathogenic and nonpathogenic micro-organisms, and oral pathology.

31-508-311 DENTAL ASSISTANT 1-CHAIRSIDE

...dental office components, infection control procedures, instruments transfer, oral evacuation, 4/6 handed dentistry, instrument identification, tray set-ups, oral health, dental dam application, rotary and handpiece identification. (Prerequisite: Accepted into Dental Assistant. Corequisites: 31-508-312, Dental Materials; 31-508-325, DA Clinical Infection Control)

31-508-312 DENTAL MATERIALS ...dental material properties, lab infection control and hazardous material handling, impression materials, care of lab and operating equipment, gypsum products, restorative and preventive materials, and tray set-ups.

31-508-313 RADIOGRAPHY 1-DENTAL

ASSISTANT ...introduction to exposing, processing, mounting, and evaluation of radiographs, darkroom maintenance and radiation protection and safety. Course also includes charting, oral and dental anatomy, morphology, embryology, and histology. (Prerequisites: 31-508-309, Dental/Personal Relationship; 31-508-325, Dental Assistant-Clinical Infection Control)

31-508-318 DENTAL CLINICAL EXPERIENCE 1

...practical experience in patient relations, chairside skills, dental materials and limited radiography in various dental offices and the on-campus clinic. (Corequisites: 31-508-310, Dental Science Biomedical; 31-508-311, Dental Asst 1-Chairside; 31-508-312, Dental Materials; 31-508-313, Radiography 1-Dental Assist; 31-508-328, Dental Office Medical Emergencies)

31-508-325 DENTAL ASSISTANT CLINICAL INFECTION CONTROL/SAFETY COMPLIANCE

...disease transmission, hazard communication management, disinfection/treatment room and sterilization/instrument care.

31-508-326 DENTAL ASSISTANT 2-CHAIRSIDE

...occupational health and safety, management and maintenance of dental office and inventory, coronal polishing, fluoride application, prevention and operative dentistry, periodontics, oral surgery, orthodontics, pediatrics, and special patients. (Prerequisite: 31-508-311, Dental Assistant 1-Chairside; Corequisite: 31-508-524, Dental Lab Procedures)

31-508-328 DENTAL OFFICE MEDICAL

EMERGENCIES ...prevention, recognition and treatment of medical emergencies in the dental office as well as patient health history, vitals, airways, resuscitation equipment, emergency kits, and an overview of pharmacology. (Corequisite: 31-508-309, Dental/Personal Relationships)

31-508-329 RADIOGRAPHY 2-DENTAL ASST

...radiation theory, safety procedures, dental exposure techniques, evaluation techniques, and clinical application. (Prerequisite: 31-508-313, Radiography 1)

31-508-322 DENTAL CLINICAL EXPERIENCE 2

...advanced practical experience in patient relations, chairside skills, laboratory procedures, radiography, dental materials, specialties, emergency procedures, and business office operations in the dental office and the on-campus clinic. (Corequisites: 31-508-324, Dental Lab Proc; 31-508-326, Dental Asst 2-Chairside; 31-508-329, Radiography 2-Dental Asst)

31-508-324 DENTAL LABORATORY

PROCEDURES ...taking and pouring of impressions, model trimming, denture and crown/bridge prosthesis, construction of acrylic trays, temporary restorations, mouth guards and bleaching trays, impressions materials and waxes, and surgical dressings. (Prerequisite: 31-508-312, Dental Materials; Corequisite: 31-508-326, Dental Assistant 2-Chairside)

Descriptions of courses not found on this page can be found in the back of the catalog.

Dental Hygienist

Program Code 105081

ASSOCIATE DEGREE - TWO YEARS PLUS ONE SUMMER

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5543. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

The Dental Hygienist program prepares students to perform oral prophylaxis, apply preventive agents, expose radiographs, and teach patients oral care.

Graduates of the Dental Hygienist program will be able to:

- Discern and manage the ethical issues of dental hygiene practice.
- Acquire and synthesize information in a critical, scientific, and effective manner.
- Provide planned educational services using appropriate interpersonal communication skills and educational strategies.
- Initiate and assume responsibility for health promotion and disease prevention activities for diverse populations.
- Systematically collect, analyze, and accurately record baseline data on the general, oral, and psychosocial health status of clients.
- Discuss condition of oral cavity, identify actual and potential problems, etiological and contributing factors, and record alternative treatment.
- Provide treatment that includes preventive and therapeutic service designed to promote and maintain oral health and assist client in achieving goals.
- Evaluate effectiveness of planned clinical and educational services and modify as necessary.

Students will be required to purchase uniforms and instruments and pay for liability insurance for dental clinical courses.

MATH LEVEL

Students should have mastered basic math skills and Accuplacer tests for algebra. For a description of basic math, see the Basic Education section of this catalog.

NOTE: A student who does not meet the above requirements should consult an NWTC counselor about ways to make up any deficiencies through testing or course work. Advance Standing Test Out is available in Radiography and Dental Materials.

EMPLOYMENT POTENTIAL

Prior to licensure as a Registered Dental Hygienist, a student is required to pass the Dental Hygiene National Board Examination and a Regional Practical Examination. A registered Dental Hygienist may practice dental hygiene in a city, county, or multi-county health department; private practice, hospital, long term care facility, or school; or in dental sales.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Dental Hygiene Instructor
- Public Health Dental Hygienist
- Dental Laboratory Technician
- Dental Sales
- Dental Insurance Review Analyst

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent
- A minimum standard composite score of 20 on the ACT assessment
- One year of biology
- One year of chemistry with a grade of C or better
- Grades of C or better in the science courses
- One year of algebra and advanced math or an 80 on the Accuplacer Test.
- Orientation before entering the program.
- Medical and dental examinations satisfactorily completed within three months before entering the program.
- Complete an [American Heart Association Health Care Provider CPR course](#) prior to program entry; maintain a current CPR status while enrolled in the program to comply with affiliating agency requirements.
- Two (2) or three (3) credits of post high school general nutrition with a grade of C or better.

Applications will be processed when requirements have been completed.

The Dental Hygienist program is accredited by the American Dental Association - Commission on Dental Accreditation
211 East Chicago Avenue
Chicago, IL 60611-2678
(312) 440-2500

CURRICULUM

The Dental Hygienist Associate Degree is a two-year, one-summer, five-semester program. Upon graduation, a student will have completed 69 credits.

Students who have already completed A&P 1 and A&P 2 courses, for a total of 6 credits, will receive credit for taking those classes prior to the change.

SUMMER SEMESTER

Course No.	Description	Credits
* 10-806-193	Anatomy/Physiology-General	4
* 10-806-199	Chemistry-Organic & Biological	3
SEMESTER TOTAL		7

FIRST SEMESTER

* 10-508-114	Dental Hygiene-Pre Clin	2
* 10-508-115	Dental Hygiene-Pre Clin/Lec	2
* 10-508-116	Histology/Embryology	1
* 10-508-117	Occupational Safety/Health	1
* 10-508-118	Anatomy-Head/Neck	3
* 10-806-197	Microbiology	4
SEMESTER TOTAL		13

SECOND SEMESTER

* 10-508-112	Radiography	3
* 10-508-113	Periodontology 1	1
* 10-508-120	Dental Hygiene 1-Clinic	2
* 10-508-121	Dental Materials	2
* 10-508-124	Dental Hygiene 1-Clinic/Lec	2
* 10-508-132	Pathology-General Oral	3
10-801-195	Communication-Written	3
SEMESTER TOTAL		16

THIRD SEMESTER

* 10-508-123	Periodontology 2	2
* 10-508-134	Dental Hygiene 2-Clinic	3
* 10-508-136	Dental Hygiene 2-Clinic/Lec	1
* 10-508-142	Dental Health-Community	2
10-801-196	Oral/Interpers Communication	3
* 10-806-185	Pharmacology	2
	Elective	3
SEMESTER TOTAL		16

FOURTH SEMESTER

* 10-508-144	Dental Hygiene 3-Clinic	3
* 10-508-146	Dental Hygiene 3-Lecture	2
10-801-198	Speech	3
10-809-196	Sociology-Intro	3
10-809-198	Psychology-Intro	3
	Elective	3
SEMESTER TOTAL		17

SUGGESTED ELECTIVES: Dental Hygiene National Board (10-508-172), Nutrition-Basic (10-303-180), Clinical-Extended (10-508-150), Periodontal Therapy-Advanced (10-508-160).

NOTE: No final grade lower than C is acceptable in any of the courses marked with an asterisk. A student must repeat that particular course to achieve a C or better final grade in order to continue in or graduate from this program. If the course is segmented, the successful retake must occur before continuing the sequence.

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-508-112 RADIOGRAPHY ...radiographic techniques; principles of radiography with emphasis on radiation safety, radiobiology, darkroom techniques, anatomical landmarks, radiographic interpretation. (Prerequisites: 10-508-118, Anatomy-Head/Neck; 10-508-114, Dental Hygiene-Pre Clinical)

10-508-113 PERIODONTOLOGY 1 ...anatomy, histology, physiology of the alveolar bone; periodontal ligament, gingiva, cementum; and evaluation of the periodontium in healthy and diseased state. (Prerequisite: 10-508-114, Dental Hygiene-Pre Clinical; Corequisite: 10-508-112, Radiography)

10-508-114 DENTAL HYGIENE-PRE CLINIC/LAB ...personal oral hygiene, operation and maintenance of dental equipment, infection control techniques, assessment of medical records, oral examination, instrumentation, polishing, and instrument sharpening. (Prerequisite: 10-303-180, Nutrition-Basic or 10-510-101, Nutrition Pathways)

10-508-115 DENTAL HYGIENE-PRE CLINIC/LECTURE ...professional ethics, personal oral hygiene, operation and maintenance of dental equipment, infection control, medical records, oral examination, instrumentation, polishing, and instrument sharpening. (Prerequisite: 10-303-180, Nutrition-Basic or 10-510-101, Nutrition Pathways)

10-508-116 HISTOLOGY/EMBRYOLOGY ...basic cell structures; embryologic development of the face and oral cavity; formation of teeth; bone eruption and exfoliation of teeth. (Prerequisite: Accepted into Dental Hygienist)

10-508-117 OCCUPATIONAL SAFETY/HEALTH ...prevention, recognition, and response to medical emergencies; occupational health and safety in accordance with OSHA mandates and CDC guidelines; epidemiology; prevention of transmissible diseases; and chemical hazard communication. (Prerequisites: 10-806-163, Chemistry-BioOrganic; 10-806-182 Anatomy & Physiology 1)

10-508-118 ANATOMY-HEAD/NECK ...dental terminology; tooth development, function, and form; permanent and primary dentitions-individual tooth characteristics; occlusal classification; periodontium; oral cavity structure; musculature of the head and neck; bones of the skull; blood, nerve supply, and lymphatic system for the head and neck; dental charting. (Corequisites: 10-508-114, Dental Hygiene-Pre Clinical; 10-508-115, Dental Hygiene-Pre Clinical/Lecture; 10-508-116, Histology/Embryology)

10-508-120 DENTAL HYGIENE 1-CLINIC ...application and practice of exposure control; hazard communication; dental examinations; dental hygiene assessments; treatment planning, interventions, evaluations, and medical emergencies in the clinical setting. (Prerequisite: 10-508-114, Dental Hygiene-Pre Clinical)

10-508-121 DENTAL MATERIALS ...sources, properties, application, and manipulation techniques of dental materials; emphasis on characteristics of dental materials and their impact within the oral environment. (Prerequisites: 10-508-114, Dental Hygiene-Pre Clinical; 10-508-117, Occupational Safety/Health)

10-508-123 PERIODONTOLOGY 2 ...examination, planning, implementation, and evaluation of client periodontal status; approach to therapy, maintenance, and epidemiology of periodontal disease; emphasis on the relationship of periodontics to the practice of dental hygiene. (Prerequisite: 10-508-113, Periodontology 1)

10-508-124 DENTAL HYGIENE 1-CLINIC/LECTURE ...treatment planning, caries process, fluoride therapy, sonic/ultrasonic scaling, oral health maintenance and disease control, air-brasive polishing, tooth hypersensitivity, pedodontic dental care, and dental hygiene history. (Prerequisite: 10-508-115, Dental Hygiene-Pre Clinical/Lecture)

10-508-132 PATHOLOGY-GENERAL ORAL ...nature of disease, variants of normal; inflammation; immunity, regeneration, and repair; developmental disorders; cysts, neoplasia, genetic disorders; and oral manifestations of systemic diseases. (Prerequisite: 10-508-114, Dental Hygiene PreClinical; Corequisite: 10-508-120, Dental Hygiene 1-Clinical)

10-508-134 DENTAL HYGIENE 2-CLINIC ...application of assessments, treatment, and prevention planning; advanced clinical skills including root surface debridement, ultrasonic scaling, and radiographic techniques; patient counseling techniques; special needs patients. (Prerequisite: 10-508-120, Dental Hygiene 1-Clinical)

10-508-136 DENTAL HYGIENE 2-CLINIC/LECTURE ...theory of establishing patient relationships, patient counseling techniques, patient compliance, behavioral change strategies, designing a personalized prevention plan, smoking cessation, dental hygiene care for special needs patients. (Prerequisites: 10-508-113, Periodontology 1; 10-508-120, Dental Hygiene 1-Clinical)

10-508-142 DENTAL HEALTH-COMMUNITY ...principles of public health dentistry relevant to current issues; student participation in assessment, planning, implementation, and appraisal of community dental health programs. (Prerequisite: 10-508-120, Dental Hygiene 1-Clinical)

10-508-144 DENTAL HYGIENE 3-CLINIC ...advanced instrumentation, root planing skills, use of oral irrigation devices, preparation for the CRDTS Practical Exam. (Prerequisite: 10-508-134, Dental Hygiene 2-Clinical)

10-508-146 DENTAL HYGIENE 3-LECTURE ...local anesthesia, dental specialties, legal relationships in dental hygiene practice, interview techniques, preparation for State Certification Exam, temporomandibular dysfunction, implant client, modified ultrasonics, geriatric dental hygiene. (Prerequisite: 10-508-136, Dental Hygiene 2-Clinical/Lecture)

Descriptions of courses not found on this page can be found in the back of the catalog.

Diagnostic Medical Sonography

PROGRAM CODE 105261

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus and Northcentral Technical College - Wausau. For more information, call: (920) 498-6866. Toll-free: (800) 422-NWTC, ext. 6866.

PROGRAM DESCRIPTION

Graduates perform routine sonographic (ultrasound) examinations of the body to include the abdomen, small parts, obstetrics, and gynecology. They work closely with physicians and may assist in the performance of invasive procedures.

Graduates of the Diagnostic Medical Sonography - Associate Degree Program will be able to:

- Apply knowledge of anatomy, physiology, positioning, and sonographic techniques to accurately demonstrate anatomical structures.
- Evaluate sonographic images for appropriate positioning and image quality.
- Exercise independent judgment and discretion in the technical performance of medical imaging procedures.
- Anticipate and provide patient comfort and safety through effective communication, interpersonal relationships, and application of body mechanics.
- Modify sonographic procedures to meet specific patient conditions.
- Function as a member of a health care system through effective procedures.
- Recognize emergency patient conditions and initiate basic life support procedures.
- Evaluate the performance of Sonography systems using quality assurance procedures and report malfunctions to proper authorities.
- Participate in career and socioeconomic opportunities available in sonographic technology through membership in professional organizations and continuing education.

MATH LEVEL

Students should have mastered basic math before entering this program. For a description of basic math, see the Basic Education section of this catalog.

NOTE: A student who does not meet the above requirements should consult with an NWTC counselor about ways to meet deficiencies through testing or course work.

EMPLOYMENT POTENTIAL

A graduate of the Diagnostic Medical Sonography program can choose to work in a variety of health care settings including clinics, hospitals, private practice physician offices, public health facilities and laboratories performing examinations in their areas of specialization.

Career advancement opportunities exist in education, administration, research, and in commercial companies as education/application specialists, sales representatives, technical advisors, etc.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalency

Evidence of successful completion of the following high school courses, or their equivalents, are required prior to acceptance into the program:

- Biology - two semesters of high school biology or one semester of postsecondary biology with a grade of "C" or better.
- Algebra - two semesters of high school algebra or one semester of postsecondary algebra with a grade of "C" or better.
- Physics - one semester of high school physics with a grade of "C" or better.
- Communication - two semesters of high school communication coursework or one semester of postsecondary work with a grade of "C" or better.
- All students are expected to have entry-level computer skills. If a candidate is unsure of their skills, the learning center basic computer skills coursework is recommended (self-choice).
- Upon invitation, must write the Accuplacer test. ACT scores may be accepted in place of the Accuplacer (students with an overall score of 20 or higher, along with acceptable ACT scores in Math, Reading, and English, will not be required to write the Accuplacer).
- Completion of a physical examination.
- Completion of professional level CPR before entry into major courses.
- Wisconsin statute requires passage of a criminal background check prior to entry into this program.
- Prior to admission, students may need to demonstrate their ability to meet the technical standards of the profession as defined by the Society of Diagnostic Medical Sonographers.

CURRICULUM

The Diagnostic Medical Sonography program is a two-year, two-summer, four-semester program. Upon graduation, a student will have completed 70 credits.

FIRST SEMESTER

Course No.	Description	Credits
* 10-526-172	DMS-Patient Care/Ethics	2
10-801-195	Communication-Written	3
10-801-196	Oral/Interpers Communication	3
	OR	
10-801-198	Speech	3
10-806-193	Anatomy/Physiology-General	4
10-809-195	Economics	3
10-809-198	Psychology-Intro	3
	SEMESTER TOTAL	18

SECOND SEMESTER

10-510-165	Medical Terminology	3
* 10-526-110	DMS-Sonography Physics/Inst 1	3
* 10-526-130	DMS-Introduction	2
* 10-526-141	DMS-Clinical Education 1	1
* 10-526-142	DMS-Clinical Education 2	2
* 10-526-161	DMS-Abdomen/Small Parts 1	2
10-806-194	Anatomy/Physiology-Advanced	4
	SEMESTER TOTAL	17

THIRD SEMESTER

* 10-526-143	DMS-Clinical Education 3	2
* 10-526-147	DMS-Cross-Sectional Anatomy	2
	Elective	3
	SEMESTER TOTAL	7

FOURTH SEMESTER

* 10-526-111	DMS-Sonography Physics/Inst 2	3
* 10-526-131	DMS-OB/GYN 1	2
* 10-526-132	DMS-OB/GYN 2	2
* 10-526-144	DMS-Clinical Education 4	2
* 10-526-162	DMS-Abdomen/Small Parts 2	2
	Elective	3
	SEMESTER TOTAL	14

FIFTH SEMESTER

* 10-526-133	DMS-OB/GYN 3	2
* 10-526-145	DMS-Clinical Education 5	2
* 10-526-163	DMS-Abdomen/Small Parts 3	2
* 10-526-164	DMS-Cardiac/Vasc Intro	3
10-809-196	Sociology-Intro	3
	SEMESTER TOTAL	12

SIXTH SEMESTER

* 10-526-146	DMS-Clinical Education 6	1
* 10-526-165	DMS-Ultrasound Registry Review	1
	SEMESTER TOTAL	2

* Core Class

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-526-110 DMS-SONOGRAPHY PHYSICS/INSTRUMENTATION 1 ...introduction to Sonography physics and instrumentation including the nature and types of sound waves, propagation of ultrasound through tissues, ultrasound transducers, and pulse-echo instruments. (Prerequisite: Accepted into Diagnostic Medical Sonography or permission of program faculty)

10-526-111 DMS-SONOGRAPHY PHYSICS/INSTRUMENTATION 2 ...continuation of sonography physics including image acquisition and display methods, resolution, artifacts, Doppler instrumentation, safety and quality control. (Prerequisite: 10-526-110, DMS-Sonography Physics/Instrumentation 1)

10-526-130 DMS-INTRODUCTION ...introduction to the fundamental principles of ultrasound including history, applications, indications, equipment, and positioning techniques. Role and responsibilities of the Diagnostic Medical Sonographer included. (Prerequisite: Accepted into Diagnostic Medical Sonography or permission of program faculty)

10-526-131 DMS-OBSTETRICS/GYNECOLOGY 1 ...sonographic techniques related to the anatomy and pathology of the pelvis, female reproductive system, early intrauterine, and ectopic pregnancies. (Prerequisite: Accepted into Diagnostic Medical Sonography or permission of program faculty)

10-526-132 DMS-OBSTETRICS/GYNECOLOGY 2 ...continuation of OB/GYN sonography including completion of the first trimester of pregnancy, and normal and abnormal fetal anatomy and physiology during the second and third trimesters of pregnancy. (Prerequisite: 10-526-131, DMS-OB/GYN 1)

10-526-133 DMS-OBSTETRICS/GYNECOLOGY 3 ...continuation of OB/GYN sonography in the second and third trimesters of pregnancy. Advanced techniques and topics to include maternal/fetal procedures. Specialty topics of OB care. (Prerequisite: 10-526-132, DMS-OB/GYN 2)

10-526-141 DMS-CLINICAL EDUCATION 1 ...introduction to Diagnostic Medical Sonography in the clinical setting. Application of didactic coursework in the general curriculum. May require student to travel. (Prerequisites: 10-526-130, DMS-Introduction and accepted into Diagnostic Medical Sonography or 10-526-130, DMS-Introduction and permission of program faculty)

10-526-142 DMS-CLINICAL EDUCATION 2 ...continuation of Diagnostic Medical Sonography clinical experience. Correlation and application of didactic coursework in the general curriculum. May require student to travel. (Prerequisite: 10-526-141, Clinical Education or accepted into Diagnostic Medical Sonography or permission of program faculty)

10-526-143 DMS-CLINICAL EDUCATION 3 ...continuation of Diagnostic Medical Sonography clinical experience. Reinforcement and broadening of knowledge gained in Clinical Education 2 to correlate with program curriculum. May require student to travel. (Prerequisite: 10-526-142, DMS-Clinical Education 2)

10-526-144 DMS-CLINICAL EDUCATION 4 ...continuation of Diagnostic Medical Sonography clinical experience. Reinforcement and broadening of knowledge gained in Clinical Education 3 to correlate with program curriculum. May require student to travel. (Prerequisite: 10-526-143, DMS-Clinical Education 3)

10-526-145 DMS-CLINICAL EDUCATION 5 ...continuation of Diagnostic Medical Sonography clinical experience. Reinforcement and broadening of knowledge gained in Clinical Education 4 to correlate with program curriculum. May require student to travel. (Prerequisite: 10-526-144, DMS-Clinical Education 4)

10-526-146 DMS-CLINICAL EDUCATION 6 ...continuation of Diagnostic Medical Sonography clinical experience. Reinforcement and broadening of knowledge gained in Clinical Education 5 to correlate with program curriculum. May require student to travel. (Prerequisite: 10-526-145, DMS-Clinical Education 5)

10-526-147 DMS-CROSS-SECTIONAL ANATOMY ...introduction to cross-sectional anatomy as related to Diagnostic Medical Sonography. Includes correlating images from other imaging modalities. (Prerequisite: Accepted into Diagnostic Medical Sonography or permission of program faculty)

10-526-161 DMS-ABDOMEN/SMALL PARTS 1 ...introduction to sonographic imaging and techniques related to the anatomy and pathology of the upper abdominal organs including the liver, gallbladder, pancreas, biliary tree, spleen and urinary tract. (Prerequisite: Accepted into Diagnostic Medical Sonography or permission of program faculty)

10-526-162 DMS-ABDOMEN/SMALL PARTS 2 ...continuation of abdominal sonography related to the gastrointestinal tract, adrenal glands, abdominal wall, peritoneum, diaphragm and fluid collections. Introduction of abdominal Doppler techniques included. (Prerequisite: 10-526-161, DMS-Abdomen/Small Parts 1)

10-526-163 DMS-ABDOMEN/SMALL PARTS 3 ...continuation of abdominal sonography including advanced Doppler techniques and invasive procedures. Techniques related to small parts anatomy, pathology, and imaging also covered. (Prerequisite: 10-526-162, DMS-Abdomen/Small Parts 2)

10-526-163 DMS-CARDIAC/VASCULAR IMAGING INTRODUCTION ...introduction to sonographic techniques used to evaluate the anatomy, physiology and pathology of the heart and the peripheral vascular system with specific attention to examination of the carotid arteries. (Prerequisite: Accepted into Diagnostic Medical Sonography or permission of program faculty)

10-526-165 DMS-ULTRASOUND REGISTRY REVIEW ...comprehensive review of program material to prepare for the national certification exams to include simulated testing environments. (Prerequisite: Accepted into Diagnostic Medical Sonography or permission of program faculty)

10-526-172 DMS-PATIENT CARE/ETHICS ...introduction to the principles of patient care in the imaging environment including medical history, patient assessment, monitoring, handline, transporting, and the patient as a person. Legal and ethical issues included. (Prerequisite: Accepted into Diagnostic Medical Sonography or permission of program faculty)

Descriptions of courses not found on this page can be found in the back of the catalog.

Diesel and Heavy Equipment Technician Program Code 324121

TECHNICAL DIPLOMA - TWO YEARS

Offered at the Sturgeon Bay campus. Admissions, registration, counselor, or course information: (920) 743-2207. Toll free: (800) 422-NWTC, Ext. 4900.

PROGRAM DESCRIPTION

Prepares students to service and repair diesel powered equipment. Instruction covers repair of steering, brakes, hydraulic systems, and chassis components.

Graduates of this program will be able to:

- Apply hydraulic systems fundamentals.
- Manage chassis, steering, and suspension systems.
- Explain diesel engine systems.
- Explain diesel engine fundamentals.
- Describe the mechanics of track drive systems.
- Perform required preventive maintenance.
- Use welding and machine tools.
- Maintain brake systems.
- Analyze electronic/electrical systems.
- Manage heating - A/C systems.
- Comprehend power train systems.
- Interpret schematic drawings.
- Diagnose engine systems.
- Service vehicle systems.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Equivalency may be established through GED testing or other tests.)

MATH LEVEL

Students should have mastered basic math skills. For a description of Basic Math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

The Diesel and Heavy Equipment Technician is employed in a variety of work environments. These include heavy equipment, truck, agriculture, marine, engine rebuilding, and speciality shops.

A graduate of the program will have the potential for employment as Construction Equipment Technician, Engine Technician, Farm Equipment Technician, Fuel Injection Technician, Service Technician, or Truck Driver/Diesel Technician.

CONSTRUCTION EQUIPMENT TECHNICIAN:

diagnoses, services, and repairs a variety of construction equipment such as track type tractors, wheel loaders, and back hoe loaders.

ENGINE TECHNICIAN:

diagnoses and repairs diesel engines.

FARM EQUIPMENT TECHNICIAN:

diagnoses, services, and repairs a variety of diesel-powered agricultural equipment.

FUEL INJECTION TECHNICIAN:

diagnoses, services, and repairs fuel injection systems.

SERVICE TECHNICIAN:

performs preventive maintenance and regularly scheduled maintenance on equipment to keep it in service.

TRUCK DRIVER/DIESEL TECHNICIAN: owns or operates a small fleet and wants to perform his/her own regular and preventive maintenance.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Diesel Equipment Mechanic Instructor
- Diesel Shop Owner
- Sales Representative
- Shop Supervisor
- Technical Service Representative
- Truck Fleet Operator

CURRICULUM

The Diesel and Heavy Equipment Technician Technical Diploma is a two-year, four-semester program offered at the Sturgeon Bay campus. Upon graduation, students will have completed 64 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-103-111	Micro: Windows-Introduction	1
10-602-118	DC Electricity Technology	1
31-804-301	Math 1-Trades	2
32-412-300	Diesel-Lab Operations	1
32-412-308	Internal Combustion Eng-Intro	1
32-412-309	Diesel Engine Service-Fund	5
32-412-312	Diesel Electrical Systems 1	3
32-442-352	Welding-Metal Working Proc	2
SEMESTER TOTAL		16

SECOND SEMESTER

32-412-320	Diesel-Chassis/Susp/Steer	4
32-412-321	Diesel-Brake Systems	3
32-412-322	Diesel Preventive Maint	4
32-412-323	Diesel Electrical Systems II	3
32-806-353	Science-Mechanics	2
SEMESTER TOTAL		16

THIRD SEMESTER

31-419-311	Hydraulics-Applied	2
32-412-324	Diesel-Electric Eng System	1
32-412-334	Diesel Engine Systems	4
32-412-336	Diesel-Mobile Hydraulic Sys	2
32-412-337	Diesel-Schematic Interpret	2
32-412-338	Diesel-Track Drive Systems	2
32-412-342	Diesel Equip Service/Maint	3
SEMESTER TOTAL		16

FOURTH SEMESTER

31-801-385	Communicating-Writing	1
31-801-386	Communicating Effectively	1
31-809-301	Social Science Survey	2
32-412-340	Diesel Engine Troubleshoot	4
32-412-341	Diesel-Power Trains	5
32-412-345	Diesel-Refrig/AC	3
SEMESTER TOTAL		16

NOTE: The Caterpillar Foundation selected this technical program for participation in its Dealer Excellence Fund. Funds from Caterpillar and a matching grant from FABCO Equipment are used for student scholarships, staff development, curriculum development, and instructional equipment.

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-602-118 DC ELECTRICITY TECHNOLOGY

...ohms, amps, voltage, wire repair, series and parallel circuits, meter use, magnetism, **research paper comparing and contrasting A/C and D/C electrical applications.

31-419-311 HYDRAULICS-APPLIED ...hydraulic schematics, drive systems, hydraulic system diagnosis/troubleshooting, hydraulic circuits, piping, fluid mechanics, seals, packings, hydraulic component operation, and accumulators.

32-412-300 DIESEL-LAB OPERATIONS ...diesel shop safety, basic equipment operation, rigging and lifting, hand and precision tools, fasteners.

32-412-308 INTERNAL COMBUSTION ENGINE-INTRODUCTION ...basic internal combustion (IC) engine types, IC Engine classifications and applications, IC engine theory and operation, IC engine construction and careers in IC engine service and repair.

32-412-309 DIESEL ENGINE SERVICE-FUNDAMENTALS ...diesel engine service procedures; lubrication, cooling, fuel intake and exhaust systems, bearings, seals, and basic diesel engine diagnosis.

32-412-312 DIESEL ELECTRICAL SYSTEMS I ...will cover but not be limited to: electronic components, electrical safety, storage batteries, charging and starting systems. Knowledge, skills, and understanding required for employment in the diesel field.

32-412-320 DIESEL-CHASSIS/SUSPENSION/STEERING ...vehicular steering systems, heavy-duty axles, suspension systems, wheels and tires, coupling systems. (Corequisite: 32-412-300, Diesel-Lab Operations)

32-412-321 DIESEL-BRAKE SYSTEMS ...braking systems, drum brake principles, disc brakes, foundation brake systems, air brakes, anti-lock systems. (Corequisite: 32-412-300, Diesel-Lab Operations)

32-412-322 DIESEL PREVENTIVE

MAINTENANCE ...safety terms, maintenance, inspection, lubricants, clutch, brakes, wheels and rims, steering, suspension, electrical, air system, and hydraulic system. (Corequisite: 32-412-300, Diesel-Lab Operations)

32-412-323 DIESEL ELECTRICAL SYSTEMS II

...will cover but not be limited to: electronic components, electrical safety, storage batteries, charging and starting systems. Knowledge, skills, and understanding required for employment in the diesel field. (Prerequisites: 32-412-311, Diesel-Elect Fundamentals)

32-412-324 DIESEL-ELECTRIC ENGINE SYSTEM

...engine, drive train, chassis, and cab computer systems software.

32-412-334 DIESEL ENGINE SYSTEMS ...shop safety, fuel system components, governors, nozzles, American Bosch systems, Robert Bosch systems, Lucas systems, Stanadyne systems, Cummins systems, Detroit diesel systems, Caterpillar systems, and testing methods. (Prerequisite: 32-412-310, Diesel Engine Fundamentals)

32-412-336 DIESEL-MOBILE HYDRAULIC SYSTEMS ...mobile hydraulics system components safety, principles of operation, diagnosis, and service. (Corequisite: 31-419-311, Applied Hydraulics)

32-412-337 DIESEL-SCHEMATIC INTERPRETATION APPLICATION

...electronic/hydraulic schematics, applications of schematics, system similarities, components, review of systems operation, practical applications in diagnosing system problems, use of special test equipment/schematics to solve problems. (Prerequisite: 32-412-323, Diesel Electrical/Electronic)

32-412-338 DIESEL-TRACK DRIVE SYSTEMS

...track shop safety, track drive component parts, system operation, inspection, system diagnoses, system repair, system service, and system maintenance. (Corequisite: 32-412-300, Diesel-Lab Operations)

32-412-340 DIESEL ENGINE TROUBLESHOOTING

...diesel engine troubleshooting steps, major check points when inspecting or operating a diesel engine, causes of poor engine performance and failure, perform engine diagnostic tests, dyno test an engine. (Prerequisite: 32-412-310, Diesel Engine Fundamentals)

32-412-341 DIESEL-POWER TRAINS ...safety, power train components, coupling systems, hydraulic retarders, mechanical transmissions, drive shafts, final drives, gear reduction boxes, planetary gear sets, chain-type final drive, belt drive systems. (Corequisite: 32-412-300, Diesel-Lab Operations)

32-412-342 DIESEL EQUIPMENT SERVICE/MAINTENANCE ...shop safety; service manuals; preventive maintenance forms; federal inspection policy; preventive maintenance for trucks, trailers, engine brakes/retarders, construction, and agricultural equipment; and electronic trouble shooting trees. (Corequisite: 32-412-300, Diesel-Lab Operations)

32-412-345 DIESEL-REFRIGERATION/AIR CONDITIONING ...safety; basics of air conditioning; refrigerants and oil; basic system and its functions; environmental safety practices; inspection, diagnosing, and using service tools. (Corequisite: 32-412-300, Diesel-Lab Operations)

Descriptions of courses not found on this page can be found in the back of the catalog.

E-Business Technology Specialist

PROGRAM CODE 101524

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5435. Toll free: (800) 422-NWTC.

The E-Business Technology Specialist program prepares students to integrate web technologies to support internet-based business systems using concepts in database integration, programming, graphics, marketing, logistics, security, and networking. This flexible degree program is best suited for an individual with sufficient work experience to enable selection of the two clusters that match career interest and organizational need.

After admission, each learner is required to complete a program planner indicating clusters selected and outlining a tentative course completion timeline. This plan will be reviewed and approved by a counselor before enrolling in courses.

All graduates of this program will be able to:

- Communicate effectively.
- State and solve technical problems.
- Describe the natural world.
- Interact within society.
- Demonstrate an understanding of business models and organizational functions necessary to conduct business in a changing environment.
- Analyze accounting information and relate it to business decisions.
- Effectively apply business math models when analyzing and solving problems.
- Use project management techniques.

Graduates selecting the **MICROCOMPUTER SPECIALIST** cluster will also be able to:

- Design customized spreadsheets, documents, and relational databases.
- Use macros, object linking, and programming techniques to automate applications.
- Identify and configure hardware components of a microcomputer.

Graduates selecting the **MICROCOMPUTER PROGRAMMER** cluster will also be able to:

- Create, edit, run, and debug programs in four languages: Java, Visual Basic, C++, SQL.
- Solve business problems using programming techniques.

Graduates selecting the **E-COMMERCE** cluster will also be able to:

- Understand the business models underlying electronic commerce.
- Effectively research business and consumer markets to create electronic business marketing strategies.
- Develop an electronic commerce marketing plan.

Graduates selecting the **WEB GRAPHIC DESIGN** cluster will also be able to:

- Modify graphics and restructure information to the protocols and formats of the internet.
- Fulfill graphic design goals.
- Implement information architecture.
- Test usability of interface design.

Graduates selecting the **NETWORK SECURITY** cluster will also be able to:

- Design, implement, and maintain a secure network environment.
- Assess the impact of emerging technologies.

Graduates selecting the **WEB DATABASE INTEGRATOR** cluster will also be able to:

- Develop, build, and configure a web application to work with an application server.
- Create a database design and effective interface to support a web application.

REQUIREMENTS FOR PROGRAM ENTRY:

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- One year of high school algebra or equivalency
- Computer familiarity and ability to use a keyboard and mouse

MATH LEVEL

Students should have mastered basic math and algebra skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

Program graduates may work in a variety of areas of an organization depending upon their selection of course clusters. A graduate of the program will have the potential for employment as Web Developer, E-Business Developer/E-Commerce Specialist, Web Technical Support, Web Analyst/E-Business Analyst, Web Programmer, and Consultant. Some positions may require additional education and/or work experience.

WEB DEVELOPER: designs, implements, and maintains intranet and internet web applications/sites.

E-BUSINESS DEVELOPER/E-COMMERCE SPECIALIST: creates business strategies and plans for providing web-based business-to-business or business-to-consumer support and service.

WEB TECHNICAL SUPPORT: develops and maintains internal system support processes and coordinates the integration of the web with other computer systems.

WEB ANALYST/E-BUSINESS ANALYST: track and analyze key business metrics related to web activities.

WEB PROGRAMMER: develops software code for web-based applications.

CONSULTANT: work with clients to improve the efficiency and effectiveness of the e-business infrastructure.

CURRICULUM

The E-Business Technology Specialist Associate Degree is a flexible degree program consisting of a common curriculum of general education and business support courses. The learner is required to select two clusters of occupational courses. Learners are required to meet with a counselor and create a program plan, which will be sent to the Business and Information Technology Division. Upon graduation, a student will have completed 69 credits.

ALL STUDENTS COMPLETE:

Course No.	Description	Credits
10-101-102	Accounting-Intro	3
10-102-158	Business-Intro	3
	OR	
10-102-182	Business Operations	3
10-152-100	E-Business Tech Internship	3
	OR	
10-152-101	E-Business Field Study	3
10-801-195	Communication-Written	3
	OR	
10-801-197	Reporting-Technical	3
10-801-196	Oral/Interpers Communication	3
10-804-151	Math-Data Proc Logic	3
	OR	
10-804-149	Math-Process	3
10-809-195	Economics	3
10-809-197	Society-Amer Contemp	3
10-809-199	Psychology-Human Rel	3
	Elective	3
	Elective	3
	TOTAL CREDITS	33

STUDENTS SELECT TWO OF THE FOLLOWING COURSE CLUSTERS:

MICROCOMPUTER SPECIALIST

10-107-161	Micro Software 1-Intro	4
10-107-162	Micro Hardware	4
10-107-170	Micro Software 2-Integration	2
10-107-172	Micro Program-Visual Basic	4
	OR	
10-107-182	Micro Operating Systems*	4
	<i>*Operating Systems is required for students also selecting the Micro Programming certificate as their second option. Students selecting any other certificate as their second option are required to take Visual Basic.</i>	
10-107-181	Micro Software 3-Access	4
	TOTAL CREDITS	18

MICROCOMPUTER PROGRAMMER

10-107-100	Computer: Programming-Intro*	1
10-107-101	Computer: Java-Intro	3
10-107-102	Computer: VisualBASIC-Intro*	3
10-107-109	Computer: Programming Project	2
10-107-140	Computer: Program 4-4GL	3
10-107-173	Micro Programming C++	3
10-107-175	Computer: VisualBASIC-Adv	3
	<i>*10-107-172 Micro Program-Visual Basic, 4 credit, may be taken in lieu of these two courses.</i>	
	TOTAL CREDITS	18

E-COMMERCE

10-104-112	E-Commerce Implement Plan	3
10-104-115	E-Commerce Online Strategies	3
	OR	
10-104-198	Market Research	3
10-104-116	E-Commerce Database Mktg	3
10-104-118	E-Commerce Principles	3
10-104-119	E-Commerce Web Marketing	3
	OR	
10-104-143	Marketing-Direct	3
10-182-130	E-Commerce Logistics/Fulfill	3
	TOTAL CREDITS	18

WEB GRAPHIC DESIGN

10-111-101	Macintosh-Image Editing	3
10-111-150	Web Graphic Design	3
10-111-151	Website Design	3
10-111-152	Web Animation Design	3
10-111-154	Macintosh-Multimedia Authoring	3
10-111-161	Macintosh Illustration	3
	TOTAL CREDITS	18

NETWORK SECURITY

10-107-144	Information Tech-Emerging	2
10-107-145	Network: Security Fundamentals	3
10-107-146	Network: Firewall Install/Conf	4
10-107-163	Network: Structures 1	3
10-107-168	Network: Structures 2	3
10-107-169	Network: Incident Reporting	3
	TOTAL CREDITS	18

WEB DATABASE INTEGRATOR

10-107-124	Web: Connectivity	3
10-107-125	Web: Database Analysis/Design	3
10-107-126	Web: Database Administration	3
10-107-127	Web: Application Security	3
10-107-128	Web: Server Side Script-Unix	3
10-107-129	Web: Server Side Scripting-MS	3
	TOTAL CREDITS	18

SUGGESTED ELECTIVES:

Depends on cluster selection. Consult with a counselor for recommendations.

This program is fully eligible for financial aid.

E-Business Technology Specialist (cont.)

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-104-112 E-COMMERCE IMPLEMENTATION PLAN ...implementation plan for a new E-Commerce initiative or E-Commerce business. Included is analyzing the market need, product development, operational planning; including outsourcing, competitive analysis, financial need forecasting, and risk assessment.

10-104-115 E-COMMERCE ONLINE SEARCH STRATEGIES ..use of essential electronic information sources (library catalogs, business databases, government resources, CD-ROM, commercial databases, World Wide Web) useful for marketing and business decision-making.

10-104-116 E-COMMERCE DATABASE MARKETING ...applications of database marketing are identified and evaluated. Create relational database structures, utilize databases to initiate marketing programs, create valuable output, and process and analyze extracted data.

10-104-118 E-COMMERCE PRINCIPLES ...how the Internet and the Web dramatically impact consumers and organizations carry out the marketing function.

10-104-119 E-COMMERCE WEB MARKETING ...traditional and electronic direct marketing strategies; methods include search engine management, direct marketing planning, database marketing, catalogs, telemarketing services, print, radio, television, and direct mailing.

10-104-143 MARKETING-DIRECT ...interactive technology, direct marketing vs. general advertising, market segmentation through databases, renting prospect lists, print and broadcast media copy, direct mail, catalogs, telemarketing skills, and script writing.

10-104-198 MARKET RESEARCH ...identifying problems and formulating problem hypothesis, situation analysis, informal investigation and secondary research, project objectives, primary research, sampling, questionnaires, interviews, processing the written report, and conclusions and data analysis.

10-107-100 COMPUTER: PROGRAMMING-INTRODUCTION ...basic techniques for developing computer programs to solve common business problems; includes logic, structure, flowcharting, comparing, looping, control breaks, variables, arrays, internal data representation, file processing, and testing procedures.

10-107-101 COMPUTER: JAVA-INTRODUCTION ...write object-oriented programs with graphical user interfaces in Java; Basics, Data and Information Processing, Object-Oriented Programming, Graphical User Interfaces and Event-Driven Programming, Graphics and Networking.

10-107-102 COMPUTER: VISUALBASIC-INTRODUCTION ...program definition and design, form design, coding, testing, debugging, interactive programs, sequential and random access files, and an introduction to data structures.

10-107-109 COMPUTER: PROGRAMMING PROJECT ...development of a major programming project in business. Project requirements and programming language subject to approval by the instructor. Student works independently with the instructor to obtain technical consultation and mentoring.

10-107-124 WEB: CONNECTIVITY ...dynamic web sites, visual design, user interactivity, database components, SQL queries, administrator and developer roles, script interactivity between web pages and databases, networking concepts, tracking, security. Programming/HTML familiarity required.

10-107-125 WEB: DATABASE ANALYSIS & DESIGN ...web database uses, analyzing information requirements, file organizations, data models, entity relationships, normalizing data, database management systems, development environments, web connectivity, creating tables, writing queries and file maintenance using SQL.

10-107-126 WEB: DATABASE ADMINISTRATION ...database administration in relation to web-based availability of data, including data dictionary creation; data warehousing; distributed databases; data modeling standards; data migration; disaster planning; records management, archival, destruction, capacity planning. (Prerequisite: 10-107-125, Web:Database Analysis & Design)

10-107-127 WEB: APPLICATION SECURITY ...operating system installation, update, configuration for the web environment including: Apache configuration, SSL configuration, file encryption using PGP, digital certificates, secure sheet, and virtual private networks.

10-107-128 WEB: SERVER SIDE SCRIPTING-UNIX ...operating system installation, update, configuration for the web environment including: Apache configuration, PERL configuration, basic and intermediate HTML, basic and intermediate PERL, and manipulating ODBC compliant databases using PERL.

10-107-129 WEB: SERVER SIDE SCRIPTING-MICROSOFT ...operating system installation, update, configuration for the web environment including: IIS configuration, Active Server Page (ASP) configuration, basic and intermediate HTML, basic/intermediate ASP, manipulating ODBC compliant databases using ASP.

10-107-140 COMPUTER: PROGRAMMING 4-4GL ...application system development using a fourth generation language, table creation/maintenance, screen designing, interactive program development, report programming/generating, menu designing/programming, and trigger processing. Requires three semesters of programming, one of which is advanced. (Prerequisites: 10-107-123, Computer: Database Concepts)

10-107-144 INFORMATION TECHNOLOGIES-EMERGING ...current issues and trends in the computer science area; possible topics: the Internet, visual programming, multimedia, computer security and ethics, and client/server.

10-107-145 NETWORK: SECURITY FUNDAMENTALS ...network security fundamentals to include desktop and server systems.

10-107-146 NETWORK: FIREWALL INSTALLATION/CONFIGURATION ...installation and configuration of several firewall types.

10-107-161 MICRO SOFTWARE 1-INTRODUCTION ...an introductory course for the Microcomputer Specialist program. Topics include: basic terminology/concepts, fundamentals of Windows and PowerPoint, and extensive coverage of Word and Excel.

10-107-162 MICRO HARDWARE ...computer terminology, component identification, POST, maintenance procedures, system boards, memory, binary and hexadecimal number systems, disk drives, FAT, operating systems, installations and configurations, internet research, troubleshooting and networking. Includes DOS exposure.

10-107-163 NETWORK: STRUCTURES 1 ...cable characteristics and termination, structured cabling systems, OSI reference model, IP addressing and subnetting, address resolution protocol, network architectures, basic router configuration, and routing information protocol.

10-107-168 NETWORK: STRUCTURES 2 ...configuring routing protocols, access control lists, broadcast and collision domains, Ethernet switches, VLANs, serial protocols, WAN services, protocol analysis, cellular communications, and Internet access alternatives. (Prerequisite: 10-107-163, Network: Structures 1)

10-107-169 NETWORK: INCIDENT REPORTING ...incident response, network surveillance, response strategies, forensic process, initial response to Windows and Unix. Investigation of Windows and Unix systems, routers, web attacks, applications servers, security/forensic tools. Requires Unix/Windows familiarity. (Prerequisites: 10-107-163, Network Structures 1 and 10-107-168, Network Structures 2)

10-107-170 MICRO SOFTWARE 2-INTEGRATION ...coverage of the integration of Microsoft Office applications. This will include DDE, OLE, fundamental programming constructs, the Office Object Model, and VBA. VBA constructions will be used to automate OLE. (Prerequisite: 10-107-161, Micro Software 1-Intro)

10-107-172 MICRO PROGRAMMING-VISUAL BASIC ...program definition and design, form design, coding, testing, debugging, interactive programs, sequential and random access files, and an introduction to data structures. (Prerequisite: 10-107-170, Micro Software 2-Integration)

10-107-173 MICRO PROGRAMMING C++ ...C++ integrated development environment to construct programs, data types, control structures; library and user defined functions; disk I/O; and dynamic memory allocation.

10-107-175 COMPUTER: VISUAL BASIC-ADVANCED ...a survey of topics related to database access. Windows common controls, multiple document interface programming, Windows APIs, component-based applications, object-oriented programming, ActiveX controls, HTML Help, and program deployment and maintenance. (Prerequisite: 10-107-172, Micro Program-VisualBASIC or 10-107-102, Computer: VisualBASIC-Intro or a course in any programming language that includes interactive programming and file processing)

10-107-181 MICRO SOFTWARE 3-ACCESS ...database management and application development including design, automation, and use of relational database management systems using Microsoft Access. (Prerequisite: 10-107-170, Micro Software 2-Integration)

10-107-182 MICROCOMPUTER OPERATING SYSTEMS ...creation of microcomputer systems: single machine systems including advanced MS-DOS commands and Windows and multi-user systems including Novell Netware and Unix. (Prerequisite: 10-107-162, Micro Hardware)

10-111-101 MACINTOSH-IMAGE EDITING ...explore the software application of Adobe Photoshop; scanning, editing, color correcting, and creating composite montage photographs. Prepare images for publication in print or on the internet. An introduction to manipulating bitmap images.

10-111-150 WEB GRAPHIC DESIGN ... (Adobe ImageReady+Actrobat) internet protocols, website navigation, information architecture and page structure, interface design, optimizing web graphics, GIF animation, prototyping interfaces, and testing browser compatibility. (Prerequisites: 10-111-161, Macintosh Illustration and 10-111-101, Macintosh-Image Editing)

10-111-151 WEBSITE DESIGN ... (Adobe Go-Live Macromedia Dreamweaver+Acrobat) format text for websites, build DHTML animation, internet based forms, cascading style sheets, CSS, web publishing, browser testing, and basic site management. (Prerequisites: 10-111-161, Macintosh Illustration and 10-111-150, Web Graphic Design)

10-111-152 WEB ANIMATION DESIGN ... (Macromedia Flash) vector animation, create, import source material, incorporate into flash movies, use Stage and Timeline, motion, shape-tweening, add sound to buttons, use Action Script, and test flash. (Prerequisites: 10-111-161, Macintosh Illustration and 10-111-101, Macintosh-Image Editing)

10-111-154 MACINTOSH-MULTIMEDIA AUTHORIZING ... (QuickTime, iMovie, Final Cut Pro) explore non-linear digital video editing, DV camera operations and audio development and processing. (Prerequisites: 10-111-161, Macintosh Illustration and 10-111-101, Macintosh-Image Editing)

10-111-161 MACINTOSH ILLUSTRATION ...create and paint basic shapes, draw, transform objects, work with type, blend shapes and colors, work with layers, special effects, and color separations. An introduction to manipulating vector based images.

10-182-130 E-COMMERCE LOGISTICS/ FULFILLMENT ...e-commerce, business-to-business e-commerce, consumer e-commerce, e-commerce distribution, e-procurement, e-commerce connection, legal and ethical issues, and e-commerce logistics applications.

Descriptions of courses not found on this page can be found in the back of the catalog.

Early Childhood Education

PROGRAM CODE 103071

ASSOCIATE DEGREE - TWO YEARS

Offered online. For more information, call the Green Bay campus: (920) 498-6866. Toll-free: (800) 422-NWTC, ext. 6866.

PROGRAM DESCRIPTION

The Early Childhood Education Program prepares students for a professional career in early childhood education, including preschool, childcare, and exceptional education settings from birth-age 12. It is designed to provide students with the skills and knowledge necessary in the field of child development.

Graduates of the Early Childhood Education Program will be prepared to:

- Develop and implement curriculum for young children.
- Design developmentally appropriate learning materials.
- Organize learning environments based upon the needs of young children.
- Understand and apply knowledge of child development and how children learn.
- Maintain and promote safe and healthy play environments.
- Value a diverse culture, model awareness, practice sensitivity and respect the backgrounds of children and their families.
- Work cooperatively with other staff members, parents, and community resource people.
- Understand and adhere to licensing regulations applicable to the industry.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information. Students must have:

- An interview or orientation prior to being accepted into the program
- A high school diploma or equivalency
- Demonstrated proficiency in basic skills through a course placement assessment
- Proper immunizations
- High School grade average of C or above grade requirement
- All students are required to complete an American Heart Association CPR course prior to program entry. Students are required to maintain a current CPR card on a two-year renewal cycle.

MATH LEVEL

Students should have mastered basic math before entering this program. For a description of basic math, see the Basic Education section of this catalog.

NOTE: A STUDENT WHO DOES NOT MEET THE ABOVE REQUIREMENTS is required to consult an NWTC counselor about ways to make up any deficiencies through testing or course work.

Wisconsin's Caregiver Law (1997 WISCONSIN ACT 27) requires a completed criminal background check prior to access to children in clinical agencies/field sites used by this program. Based upon results of the criminal background check, a student may be denied access to sites and thus would not be able to complete the program. For the most current information on the Caregiver Law, visit this Web site: www.dhfs.state.wi.us

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as an Early Childhood Teacher in a group center, Family Childcare Provider -Teacher - Owner, Nanny, Head Start Teacher, Pre-Kindergarten Assistant Teacher at a Public/Private School, Child Care Center Supervisor/Manager, Assistant Director of an Early Childhood Program, Early Childhood Program Director, Child Care Center Administrator, and Owner of Childcare Center.

EARLY CHILDHOOD TEACHER IN PRESCHOOL OR GROUP CHILDCARE CENTERS/HEAD START TEACHER:

plans and implements daily activities with concern for health, safety, and welfare for a designated group of children; supervises the assistant childcare teacher; administers instructional program to young children that promotes their physical, social, psychological, and intellectual development; and provides a flexible balance of active and quiet activities, individual and group activities, indoor and outdoor activities, free choice, and guided activities.

EARLY CHILDHOOD PROGRAM DIRECTOR, DAY CAMP DIRECTOR, CHILD CARE CENTER ADMINISTRATOR, CHILD CARE CENTER MANAGER:

The above positions may require responsibilities of one or more of the following items: responsible to the Board of Directors for day-to-day operations of entire school, including programming, facility, fiscal responsibilities, providing customer service, and all human resource functions such as: hiring/firing, supervision, training, and evaluation of staff.

FAMILY CHILDCARE PROVIDER/TEACHER/OWNER:

plans and implements comprehensive program for the child's total development with concern for child's health, safety, and welfare in a family/home environment.

FUTURE OPPORTUNITIES:

NWTC has formal program-to-program transfer agreements with the University of Wisconsin-Milwaukee, University of Wisconsin-Whitewater, and University of Wisconsin-Parkside, which will give graduates an opportunity to obtain their baccalaureate degree.

CURRICULUM

The Early Childhood Education Associate Degree Program is a two-year program. Upon graduation, a student will have completed 70 credits. Courses are offered online.

FIRST SEMESTER

Course No.	Description	Credits
10-307-103	Childhood-Early Intro	3
10-307-104	Child Growth/Development 1	3
10-307-105	Child-Health/Safety/Nutr	3
10-801-196	Oral/Interpers Communication	3
	Elective	3
SEMESTER TOTAL		15

SECOND SEMESTER

10-307-116	Creative Lrng Act Curr 1	3
10-307-117	Childhood-Early Practicum 1	3
10-307-118	Childhood-Early Seminar 1	1
10-307-119	Child Behavior-Guiding	3
10-809-198	Psychology-Intro	3
SEMESTER TOTAL		13

THIRD SEMESTER

10-307-120	Childhood-Early Grow/Dev 2	3
10-307-121	Creative Lrng Act Curr 2	3
10-307-122	Childhood-Early Practicum 2	3
10-307-123	Childhood-Early Seminar 2	1
10-801-195	Communication-Written	3
SEMESTER TOTAL		13

FOURTH SEMESTER

10-307-112	Infant/Toddler-Caregivers	3
10-307-130	Childhood-Early Practicum 3	3
10-307-131	Childhood-Early Seminar 3	1
10-307-132	Children-Differing Abilities	3
10-809-196	Sociology-Intro	3
	Elective	3
SEMESTER TOTAL		16

FIFTH SEMESTER

10-307-133	Childhood-Admin Early Educ	3
10-307-135	Childhood-Early Prac/Prof 4	3
10-307-136	Childhood-Early Seminar 4	1
10-804-101	Math-Business	3
10-809-195	Economics	3
SEMESTER TOTAL		13

NOTE: It is necessary to show good health as evidenced by a medical examination within three months prior to beginning practicum class.

For further details, contact Sally Martin at (920) 498-6866.

SUGGESTED ELECTIVES: Infant Toddler-Group Care (10-307-113), Infant Toddler-Family/Society (10-307-114), Child-mentor/Teacher Seminar (10-307-106).

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-307-104 CHILD GROWTH/DEVELOPMENT 1

...child growth and development theories; analyze growth and development of children; domains of development; social, cultural, and economic influences on child development.

10-307-105 CHILD-HEALTH/SAFETY/

NUTRITION ...legal and ethical responsibilities of early childhood education professionals in providing for the health, safety, and nutrition of young children; governmental regulations; safety of indoor and outdoor environments; universal precautions for routine care for children; emergency situations; health assessments; healthy food habits.

10-307-116 CREATIVE LEARNING ACTIVITIES

CURRICULUM 1 ...creative learning activities; diversity and developmentally appropriate, bias-free curriculum including literature, music, art, and small and large muscle activities; techniques for teacher-made materials.

10-307-117 CHILDHOOD-EARLY PRACTICUM 1

...student teaching experience working with young children's care setting; observe and record children's behavior, integrate anti-bias strategies, and develop learning plans to facilitate children's play. (Prerequisites: 10-307-104, Child Growth and Development 1 and 10-307-105, Child-Health/Safety/Nutrition)

10-307-118 CHILDHOOD-EARLY SEMINAR 1

...introduction to the early childhood classroom; investigate strategies and skills before entering the classroom. Discuss and problem solve with fellow classmates; analyze teaching/learning practices. (Corequisite: 10-307-117, Childhood-Early Practicum 1)

10-307-120 CHILDHOOD-EARLY GROWTH/

DEVELOPMENT 2 ...physical, social, emotional, and cognitive domains of the infant, preschool child, and school-age child; developmental milestones and developmental issues; application to the early childhood classroom. (Prerequisite: 10-307-104, Child Growth/Development 1)

10-307-121 CREATIVE LEARNING ACTIVITIES

CURRICULUM 2 ...continuum of Creative Learning Activities Curriculum 1; explore a wide variety of creative learning activities in all developmental domains; plan developmentally appropriate, bias-free curriculum for young children. (Prerequisite: 10-307-116, Creative Lrng Act Curr 1)

10-307-122 CHILDHOOD-EARLY PRACTICUM 2

...higher-level skills for observing and recording children's behavior, integrate anti-bias strategies, and develop learning plans to facilitate children's play by serving as a student teacher in an early childhood classroom; communication and involvement strategies, tools and skills to use when communicating with families. This learning occurs under the guidance of an experienced, cooperating teacher and an NWTC instructor. (Prerequisite: 10-307-117, Childhood-Early Practicum 1)

10-307-123 CHILDHOOD-EARLY SEMINAR 2

...reinforces the learning and increased skill level the student teacher gains in the early childhood classroom; practice strategies and skills before entering the classroom. Discuss and problem solve with fellow classmates; analyze teaching/learning practices. (Corequisite: 10-307-122, Childhood-Early Practicum 2)

10-307-130 CHILDHOOD-EARLY PRACTICUM 3

...higher-level skills for observing and recording children's behavior, integrate anti-bias strategies, and develop learning plans to facilitate children's play by serving as a student teacher in an early childhood classroom; communication and involvement strategies, tools and skills to use when communicating with families. This learning occurs under the guidance of an experienced, cooperating teacher and an NWTC instructor. (Prerequisite: 10-307-122, Childhood-Early Practicum 2)

10-307-131 CHILDHOOD-EARLY SEMINAR 3

...reinforces the learning and increased skill level the student teacher gains in the early childhood classroom; analyze family involvement with the early childhood program; communication tools. Discuss and problem solve with fellow classmates; analyze teaching/learning practices. (Corequisite: 10-307-130, Childhood-Early Practicum 3)

10-307-133 CHILDHOOD-ADMINISTERING

EARLY EDUCATION ...early childhood education program development and management; financial plans, staff, program philosophy, developmentally appropriate programs, policies, records, and opportunities for family involvement. (Prerequisite: 10-307-130, Childhood-Early Practicum 3)

10-307-135 CHILDHOOD-EARLY PRACTICUM/

PROFESSIONALISM 4 ...serve as a classroom teacher in a childcare center or other Early Education Program. Higher-level skills for observing and recording children's behavior, integrate anti-bias strategies, and develop learning plans to facilitate children's play by serving as a student teacher in an early childhood classroom. Professionalism in the early childhood education field; portfolio development. This learning occurs under the guidance of an experienced, cooperating teacher and an NWTC instructor. (Prerequisite: 10-307-130, Childhood-Early Practicum 3)

10-307-136 CHILDHOOD-EARLY SEMINAR 4

...reinforces the learning and increased skill level the student teacher gains in the early childhood classroom; advocate for families; family communication tools; staff development strategies; discuss and problem solve with fellow classmates; analyze teaching/learning practices. (Corequisite: 10-307-135, Childhood-Early Prac/Prof 4)

Descriptions of courses not found on this page can be found in the back of the catalog.

Electrical Engineering Technology Program Code 106621

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5435. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Electronic Engineering Technology prepares students to test, maintain, and troubleshoot electrical and electronic devices as found in machinery, computers, and communications. The EET grad will be able to transfer to a four-year bachelors degree program in Electrical Technology.

Graduates of the Electrical Engineering Technology Program will be able to:

- Adhere to workplace safety standards.
- Communicate using common technical terminology and graphic symbology.
- Write a technical document.
- Develop an industry acceptable team-centered work ethic.
- Use office suite software package tools.
- Solve problems using algebra, trig, complex numbers, logarithms, exponentials and calculus.
- Relate mathematics to the field of electricity and electronics.
- Interpret graphical data.
- Measure electrical parameters in DC and wideband AC circuits.
- Apply circuit theorems to AC/DC RLC circuits.
- Apply boolean theorems to basic digital circuits.
- Describe transfer characteristics of frequency sensitive linear circuits.
- Manipulate formulas describing electrical/electronic phenomena.
- Predict operation of circuits containing active components.
- Describe the various digital modulation techniques.
- Identify characteristics of power electrical devices and circuits.
- Describe the assembly and interconnection's of a microprocessor system.
- Use computer assembly language to program microprocessors and interface circuits.
- Operate microprocessor interface circuits.
- Describe wireless analog communication techniques.
- Analyze automatic electrical machine control circuits.
- Use tools for electrical/electronic test and assembly tasks.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

First semester DC and Intermediate Algebra have 804-130, Algebra/Trig, as a prerequisite.

MATH LEVEL

To complete the program in a minimum of 2 years, students must have satisfied or completed Algebra/Trig 804-130 before entering first semester. Other beginning courses require mastery of algebra skills. For a description of algebra skills see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as an Electrical/Electronic Development Technician, Electrical/Electronic Maintenance Technician, Electrical Test Technician, Electronics Technician, and Field Service Technician.

ELECTRICAL/ELECTRONIC DEVELOPMENT TECHNICIAN: assists engineers in the design and development of experimental and prototype equipment and products.

ELECTRICAL/ELECTRONIC MAINTENANCE TECHNICIAN: services and programs in-plant automatic control equipment, computers, robots, and other equipment.

ELECTRICAL TEST TECHNICIAN: tests, troubleshoots, and inspects electrical/electronics products (quality control testing).

ELECTRICAL/ELECTRONICS TECHNICIAN: maintains equipment including motor controllers, cables, communication equipment, computers, security systems, CNC equipment, programmable controllers, robots, and automatic production equipment; works with an engineer in building breadboard and prototype devices; and evaluates and tests electronic devices and systems.

FIELD SERVICE TECHNICIAN: services and overhauls equipment in the customer's facility; works with sales personnel; and demonstrates new equipment to potential customers.

With the additional education this transfer program affords, and/or work experience, graduates may find other opportunities for employment.

- Computer Field Service Supervisor
- Electrical/Electronics Production Superintendent
- Electrical/Electronics Maintenance Supervisor
- Field Service Engineer
- Electrical Engineer

EARNING POTENTIAL: Graduates of the Electrical Engineering Technology Associate degree program have the potential to earn over \$50,000 per year after five years of work experience. Graduates who transfer and complete the four-year Electrical Engineering Technology program can expect larger returns initially and larger lifetime earnings.

CURRICULUM

The Electrical Engineering Technology Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 70 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-605-110	Tech Skills 1	1
10-660-101	Digital 1: Logic	1
10-660-102	Digital 2: Sequential	1
10-660-103	Digital 3: Registers	1
10-660-104	DC 1: Introduction	1
10-660-105	DC 2: Circuits	1
10-660-106	DC 3: Circuit Theorems	1
10-801-195	Communication-Written	3
10-804-131	Math-Algebra/Inter	3
* 10-809-195	Economics	3
SEMESTER TOTAL		16

SECOND SEMESTER

10-660-107	AC 1: Properties	1
10-660-108	AC 2: Reactance	1
10-660-109	AC 3: RLC Circuits	1
10-660-110	Electronics 1: Diodes-Basic	1
10-660-111	Electronics 2: Trans-Basic	1
10-660-112	Electronics 3: Op-Amps-Basic	1
10-660-113	Digital 4: ALU	1
10-660-114	Digital 5: Characteristics	1
10-660-115	Digital 6: Systems	1
10-801-197	Reporting-Technical	3
10-804-132	Math-Geometry/Analytic	3
10-806-150	Physics 1-Technical	3
SEMESTER TOTAL		18

THIRD SEMESTER

10-605-124	Microprocessors 1	3
10-605-136	Electronics-Linear	3
10-605-137	Data Communications 1	3
10-662-112	DC/AC 3	3
* 10-809-196	Sociology-Intro	3
	Elective	3
SEMESTER TOTAL		18

FOURTH SEMESTER

10-605-144	Microprocessors 2	3
10-605-148	Analog Communications	3
10-605-150	Electricity-Power	3
10-662-124	Electronic Circuit Analysis	3
* 10-809-198	Psychology-Intro	3
	OR	
* 10-809-199	Psychology-Human Rel	3
	Elective	3
SEMESTER TOTAL		18

* Taken in any order

Suggested Electives: Electives to be completed in order to transfer to bachelor's degree are Calculus 1 (10-804-180), Calculus 2 (10-804-181).

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-605-124 MICROPROCESSORS 1

...microprocessors using a microcontroller, assembly language programming, and microprocessor architecture, digital information processing on the basic, machine level of a computer. (Prerequisites: 10-660-115, Digital 6 Systems; 10-660-112, Basic Electronics 3:Op-Amps)

10-605-136 ELECTRONICS-LINEAR

...active and passive linear circuits including filters, resonant and impedance matching circuits, and linear amplifiers using BJT and FET active element. (Prerequisites: 10-660-109, AC 3:RLC Circuits; 10-660-112, Basic Electronics 3:Op-Amps)

10-605-137 DATA COMMUNICATIONS 1

...circuits and principles in pulse amplitude, time, code modulation and delta modulation, sampling and noise effects using modulation techniques, and network concepts. (Prerequisites: 10-660-112, Basic Electronics 3: Op-Amps; 10-660-115, Digital 6:Systems)

10-605-148 ANALOG COMMUNICATIONS

...modulation principles including AM, FM, and SSB; noise influence on receiving systems, antenna characteristics, radiating fields, and high frequency propagation in feedlines. (Prerequisite: 10-605-136, Electronics-Linear)

10-605-150 ELECTRICITY-POWER

...the principles, analysis and applications of transformers, DC and AC machines and their control. Labs will illustrate characteristics of the devices using operating machines. (Prerequisite: 10-660-108, AC 2: Reactance)

10-660-101 DIGITAL 1: LOGIC ...AND, OR, NOT, NAND, NOR, logic operation using switch logic, ladder logic, and gate logic. Simplification methods using Boolean theorms and Karnaugh Maps, and timing diagram analysis.

10-660-102 DIGITAL 2: SEQUENTIAL ...operation and connection of Latches, RS flip-flops, JK flip-flops, and D flip-flops using timing diagram analysis, and some simple applications are studied. (Corequisite: 10-660-101, Digital 1 Logic)

10-660-103 DIGITAL 3: REGISTERS ...analyze and design asynchronous up counters, down counters, presettable counters, ring counters, and Johnson counters, and analyze synchronous counters. Analyze and design various types of shift registers. (Corequisite: 10-660-102, Digital 2: Sequential)

10-660-104 DC 1: INTRODUCTION ...introduction to the concepts of DC electricity and simple series circuits. Voltage, Current, Resistance, Ohm's Law, Power and Kirchoff's Voltage Law are defined. (Prerequisite: 10-804-130, Algebra/Trigonometry)

10-660-105 DC 2: CIRCUITS ...analysis of parallel and series-parallel circuits. Application of Kirchoff's Current Law to parallel circuit combinations. Introduction of current sources and source conversions. (Corequisite: 10-660-104, DC 1: Intro)

10-660-106 DC 3: CIRCUIT THEOREMS ...analysis of circuits using various advanced methods. Branch, loop, and node methods are studied. Eight network theorems are presented for the solution of circuit voltages and circuits. (Corequisite: 10-660-105, DC 2: Circuits)

10-660-107 AC 1: PROPERTIES ...introduction to the properties of Capacitors and Inductors including types and behavior in switching circuits. Inductor basics include a study of magnetic fields. (Prerequisites: 10-660-105, DC 2-Circuits and 10-804-131, Algebra-Intermediate)

10-660-108 AC 2: REACTANCE ...study of the way inductive, capacitive, and resistive components behave in a circuit excited by a sine waveform. Effective and average values of the sinewave are derived. (Corequisite: 10-660-107, AC 1:Properties)

10-660-109 AC 3: RLC CIRCUITS ...power flow in complex AC circuits based on resistive and reactive components. Description of the power triangle and power factor. Calculation of voltages and currents in complex AC circuits. (Corequisite: 10-660-108, AC 2: Reactance)

10-660-110 ELECTRONICS 1: DIODES-BASIC ...introduction to the characteristics and usage of semiconductor diodes in rectifiers and linear power supplies. Special diodes and diode circuits are also considered. (Corequisite: 10-660-107, AC 1: Properties)

10-660-111 ELECTRONICS 2: TRANSISTOR-BASIC ...introduction to the characteristics, bias, and usage of semiconductor transistors in amplifying circuitry. BJTs, JFETs, MOSFETs and general amplifier characteristics are studied. (Corequisite: 10-660-110, Electronics 1: Diodes-Basic)

10-660-112 ELECTRONICS 3: OP-AMPS-BASIC ...introduction to the circuit characteristics of integrated operational amplifiers. The various connections, inverting, non-inverting, and comparator will be studied as well as specialized applications such as summers and filters. (Corequisite: 10-660-111, Electronics 2:Transistor-Basic)

10-660-113 DIGITAL 4: ALU ...unsigned and signed arithmetic using binary numbers, the construction of adder circuits and subtraction circuits, and the analysis of a computer ALU is studied. (Prerequisite: 10-660-103, Digital 3: Registers)

10-660-114 DIGITAL 5: CHARACTERISTICS ...propagation delay, rise time, fall time, setup and hold time, asynchronous timing considerations, Schmitt trigger devices, one-shots and astable multivibrators, and synchronous counter design are studied. (Corequisite: 10-660-113, Digital 4: ALU)

10-660-115 DIGITAL 6: SYSTEMS ...interconnection of ALU, registers, memory, decoders, control and sequence logic, glue-logic, clock and I/O into a working system is studied in block and circuit form. (Corequisite: 10-660-114, Digital 5: Characteristics)

10-662-112 DC/AC 3 ...apply Thevenins and Nortons Theorems in practical problems involving complex AC circuits. Solve complex AC circuits using Mesh and Nodal techniques and describe power flow in complex AC circuits. (Prerequisite: 10-660-109, AC 3:RLC Circuits)

10-662-124 ELECTRONIC CIRCUIT ANALYSIS ...develop equations for and analyze transistor amplifier circuits for bias, small signal gain, and transfer function including frequency response using Bode plot graphs of first order functions. (Prerequisite: 10-605-136, Electronics-Linear)

Descriptions of courses not found on this page can be found in the back of the catalog.

Electrical Power Distribution Program Code 314132

TECHNICAL DIPLOMA - NINE MONTH (Begins in June)

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Electrical Power Distribution prepares students to install, maintain, and operate electrical systems to supply electric energy to residential, commercial, and industrial customers, and joint gas and electric underground generation facilities.

Graduates of the Electrical Power Distribution Program will be able to:

- Assist in the construction of electric transmission systems.
- Secure a (CDL) commercial Driver's License.
- Relate electrical theory to electric power systems.
- Work comfortably at heights.
- Climb poles and towers.
- Be knowledgeable in personal protective equipment to safely perform specific work
- Identify sub-station components.
- Install underground electric systems
- Operate Electrical Power Distribution equipment.
- Troubleshoot power distribution and transmission systems.
- Communicate technical information.
- Assist in the construction of power distribution systems.
- Identify methods of electrical generation.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Equivalency may be established through GED testing or other tests.)
- Be able to obtain a commercial driver's license
- Place satisfactorily in the NWTC mathematics examination

MATH LEVEL

Students should have mastered basic math skills. For a description of Basic Math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as a Line Technician, Lead Line Technician, Line Technician Supervisor, Cable TV Line Technician, Telephone Line Technician, Technician in an Electricity Generating Plant, or Installer/Maintainer of Underground Systems. Graduates in those jobs will perform construction, operations, and maintenance work on the electric power system and equipment.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Line Coordinator
- Line Apprentice
- Safety Advisor

CURRICULUM

The Electrical Power Distribution Technical Diploma is a one-year, three-semester program. Upon graduation, a student will have completed 32 credits.

FIRST SEMESTER (SUMMER)

Course No.	Description	Credits
31-413-330	Line Elec Field Trng 1	5
31-413-353	Electricity-Basic	1
31-413-362	Line Elec-Safety 1	1
31-804-310	Math-Algebra/Trades	2
SEMESTER TOTAL		9

SECOND SEMESTER

10-103-105	Microsoft Off-Word/Excel	2
31-413-335	Line Elec-Const Standards	1
31-413-336	Line Elec Field Trng 2-A	5
31-413-337	Line Elec Field Trng 2-B	5
31-413-355	Electricity-Linepersons	2
31-413-364	Line Elec-Safety 2	1
SEMESTER TOTAL		16

THIRD SEMESTER

31-413-332	Line Elec Field Trng 3	5
31-413-361	Lineman-Safety/First Aid	1
31-801-386	Communicating Effectively	1
SEMESTER TOTAL		7

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

31-413-330 LINE ELECTRICIAN FIELD

TRAINING 1 ...pole climbing, care of equipment/vehicle operation, setting and removing poles/line layout, pole framing, guys and anchors, conductor string, sagging, tying/transformers, operation, application, construction/safety.

31-413-332 LINE ELECTRICIAN FIELD

TRAINING 3 ...protective grounds, transmission, substation operations and maintenance, metering tools, transmission hot stick use and safety, and stray voltage precautions. (Prerequisite: 31-413-337, Line Electrician Field Training 2-B)

31-413-335 LINE ELECTRICIAN-

CONSTRUCTION STANDARDS ...distribution standards overhead, underground, primary, secondary, clearances, work practices, material and safe work practices.

31-413-336 LINE ELECTRICIAN FIELD

TRAINING 2-A ...transformer installation, operation, maintenance; regulator, capacitor and OCR operation and maintenance. (Prerequisite: 31-413-330, Line Electrician Field Training 1)

31-413-337 LINE ELECTRICIAN FIELD

TRAINING 2-B ...underground installation and equipment; street lighting operation and maintenance; protective equipment use; map/diagram reading, code clearance requirements; use of tree trimming methods and tools. (Prerequisite: 31-413-336, Line Electrician Field Training 2-A)

31-413-353 ELECTRICITY-BASIC ...basic electricity: fundamental laws and circuit analysis. (Prerequisite: Accepted into Electrical Power Distribution)

31-413-355 ELECTRICITY-LINEPERSONS

...electric power/energy, three-phase voltage generation, three-phase circuit power, transformer operation principles, transformer connections, and safety practices in high voltage applications. (Prerequisite: 31-413-353, Electricity-Basic)

31-413-361 LINEMAN-SAFETY/FIRST AID

...substation construction and maintenance, first aid procedures, mouth-to-mouth resuscitation, safety code analysis, recordkeeping, external heart massage, and safety/accident analysis. (Prerequisite: Accepted into Electrical Power Distribution)

31-413-362 LINE ELECTRICIAN-SAFETY 1

...general rules, definitions, applications, responsibility, reporting accidents, injuries, hand and power tools, ladders, scaffolds, handling materials, operation of company automotive equipment. (Prerequisite: Accepted into Electrical Power Distribution)

31-413-364 LINE ELECTRICIAN-SAFETY 2

...electrical section, line clearing, right-of-way maintenance; generating stations including theory and hands-on working on overhead lines; protective equipment; underground systems; tree trimming; and substations. (Prerequisite: 31-413-362, Line Electrician-Safety 1)

Descriptions of courses not found on this page can be found in the back of the catalog.

Electricity

Program Code 314131

TECHNICAL DIPLOMA - ONE YEAR

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC. Visit the Electricity Web Site at www.nwtc.edu.

PROGRAM DESCRIPTION

Electricity prepares students to install, maintain, and service basic electrical equipment used in residential, commercial, and industrial settings.

Graduates of the Electricity Program will be able to:

- Perform safe work practices.
- Apply National and Wisconsin State Electrical Codes to electrical installations.
- Install, maintain, and troubleshoot residential, commercial, and industrial electrical systems.
- Perform diagnostic testing on electrical systems.
- Apply basic calculations to electrical systems and installations.
- Demonstrate the operation of AC and DC motors.
- Install and troubleshoot basic motor control systems.
- Interpret electrical diagrams.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent (Equivalency may be established through GED testing or other tests.)
- Place satisfactorily in the NWTC mathematics and algebra examinations

MATH LEVEL

Students should have mastered high school algebra skills and have a desire to learn advanced algebra and trigonometry. For a description of Basic Math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as a Construction Electrician, or Industrial Maintenance Electrician.

CONSTRUCTION ELECTRICIAN: installs and services conduit, wire, cable, and equipment in new and existing residential, commercial, and industrial structures.

INDUSTRIAL MAINTENANCE ELECTRICIAN: installs, maintains, and troubleshoots motors, motor controls, lighting, and other electrical systems in an industrial plant.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Electrical Construction Supervisor
- Electrical Engineering Technician
- Journey-Level Electrician
- Electrical Contractor
- Electrical Maintenance Supervisor

Please visit the Electricity Program Web site at www.nwtc.edu

CURRICULUM

The Electricity Technical Diploma is a one-year, two-semester program. Upon graduation, a student will have completed 29 credits.

FIRST SEMESTER

Course No.	Description	Credits
31-413-314	DC Circuits	2
31-413-316	Residential Elec Code 1	1
31-413-319	Residential Wiring 1	3
31-413-326	Residential Elec Code 2	1
31-413-329	Residential Wiring 2	3
31-413-334	AC Circuits	2
31-449-301	Electrical Safety	1
31-804-311	Algebra-Electricity	1
31-804-321	Trigonometry-Electricity	1
SEMESTER TOTAL		15

SECOND SEMESTER

31-413-327	Commercial Wiring Techniques	2
31-413-328	Motors/Transformers	2
31-413-339	Industrial Controls	3
31-413-346	Commercial Elec Code	1
31-413-349	Electric Motor Control	3
31-413-359	Electrical Internship	1
31-801-385	Communicating-Writing	1
31-801-386	Communicating Effectively	1
SEMESTER TOTAL		14

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

31-413-314 DC CIRCUITS ...the electron theory, voltage, current, resistance, power, ohm's law, test equipment, conductors, and direct current circuits. (Corequisite: 31-804-311, Algebra-Electricity)

31-413-316 RESIDENTIAL ELECTRICAL CODE 1 ...general code requirements, plans and specifications, wiring methods.

31-413-319 RESIDENTIAL WIRING 1 ...safety, electrical code applications, box selection, wire selection, wire terminations, single-point lighting control, multiple-point lighting control, receptacles. (Corequisite: 31-413-316, Residential Elec Code 1)

31-413-326 RESIDENTIAL ELECTRICAL CODE 2 ...special purpose outlets, electrical service, home automation systems. (Prerequisite: 31-413-316, Residential Electrical Code 1)

31-413-327 COMMERCIAL WIRING TECHNIQUES ...raceways and fittings, conduit bending, wire pulling methods and fastening systems.

31-413-328 MOTORS/TRANSFORMERS ...magnetism, DC machines, three-phase motors, single-phase motors, alternators, single-phase transformers, three-phase transformers.

31-413-329 RESIDENTIAL WIRING 2 ...layout and design, circuit determinations, cable installation, small appliance branch circuits, special purpose outlets, multi-wire circuits, low voltage wiring. (Pre-requisites: 31-413-319, Residential Wiring 1; Co-requisite: 31-413-326, Residential Electrical Code 2)

31-413-334 AC CIRCUITS ...sine wave, inductance, capacitance, series circuits, parallel circuits, power factor, three-phase circuits. (Prerequisite: 31-413-314, DC circuits; 31-804-321, Trigonometry-Electricity)

31-413-339 INDUSTRIAL CONTROLS ...electrical symbols, wiring diagrams, ladder diagrams, control circuits, control logic, relays, types of control, control devices, time-delay control. (Prerequisite: 31-413-324, DC Machines)

31-413-346 COMMERCIAL ELECTRICAL CODE ...code requirements, plans and specifications, wiring methods, electrical service. (Prerequisite: 31-413-326, Residential Electrical Code 2)

31-413-349 ELECTRIC MOTOR CONTROL ...motor starters, overload relays, motor reversing circuits, motor starting methods, load devices, troubleshooting motor circuits, programmable controller hardware, programmable controller programming. (Pre-requisite: 31-413-339, Industrial Controls)

31-449-301 ELECTRICAL SAFETY ...standard first aid, CPR and OSHA 10 hour course as it relates to the electrical field.

Descriptions of courses not found on this page can be found in the back of the catalog.

Electro-Mechanical Technology

Program Code 106201

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Electro-Mechanical Technology prepares students for employment as plant-floor and field service technicians who assemble, install, troubleshoot, repair, and modify mechanical, electrical, and programmable controllers found on industrial machinery.

Graduates of the Electro-Mechanical Technology Program will be able to:

- Understand and apply knowledge of electricity, electronics, hydraulics, and electric motors and mechanics.
- Read technical drawings, schematics, and diagrams.
- Document technical information through descriptive writing, sketches/diagrams, mathematical expression, computation, and graphs.
- Perform electrical, mechanical, and fluid measurements by properly selecting tools and test equipment.
- Perform electrical/mechanical assembly/disassembly, repair, or calibrate components by properly selecting tools and equipment and following procedures.
- Understand the overall operation and control of machines.
- Understand basic fastening skills related to machine fabrication and assembly requirements.
- Apply electrical skills to troubleshoot control and operator panels.
- Apply programming languages to the control of single programmable controllers and industrial networks.
- Apply critical thinking skills to solving problems.
- Effectively communicate and perform in a team environment.

REQUIREMENT FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

MATH LEVEL

Students should have mastered algebra skills before entering this program. For a description of algebra skills, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as an Automated Equipment Technician, Electro-Mechanical Technician, Electronics Technician, Field Service Technician, Fluid Power Technician, and Installation Technician.

AUTOMATED EQUIPMENT TECHNICIAN:

maintains and repairs electronically-controlled automatic production equipment including servo-hydraulics equipment, programmable controllers, motor controllers, and robotic equipment.

ELECTRO-MECHANICAL TECHNICIAN:

maintains and repairs electro-mechanical equipment including drive systems, position sensors, cabling, and automatic production equipment; works with mechanical and/or electrical engineers to install and evaluate electro-mechanical systems; and builds mock-ups of production equipment.

ELECTRONICS TECHNICIAN: maintains and repairs electronic equipment including cables, communication equipment, computers, security systems, and CNC equipment; works with electronics engineer in building breadboard and prototype devices; and evaluates and tests electronic devices and systems.

FIELD SERVICE TECHNICIAN: services, repairs, and overhauls equipment in the customer's facility; works with sales personnel; and demonstrates new equipment to potential customers.

FLUID POWER TECHNICIAN: maintains and repairs industrial hydraulic/pneumatic production equipment, hydraulic/pneumatic control systems, hydraulic/pneumatic robots, and servo and proportional hydraulic systems.

INSTALLATION TECHNICIAN: installs and sets up automated production equipment, robotic systems, and production control systems.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Electro-Mechanical Service Supervisor
- Electro-Mechanical Shop Supervisor
- Electro-Mechanical Systems Test Engineer
- Field Service Supervisor
- Maintenance Group Manager
- Service Control Technician

CURRICULUM

The Electro-Mechanical Technology Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 65 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-605-110	Tech Skills 1	1
10-660-101	Digital 1: Logic	1
10-660-102	Digital 2: Sequential	1
10-660-103	Digital 3: Registers	1
10-660-104	DC 1: Introduction	1
10-660-105	DC 2: Circuits	1
10-660-106	DC 3: Circuit Theorems	1
10-801-195	Communication-Written	3
10-804-131	Math-Algebra/Inter	3
10-809-195	Economics	3
SEMESTER TOTAL		16

SECOND SEMESTER

10-605-120	Tech Skills 2	1
10-660-107	AC 1: Properties	1
10-660-108	AC 2: Reactance	1
10-660-109	AC 3: RLC Circuits	1
10-660-110	Electronics 1: Diodes-Basic	1
10-660-111	Electronics 2: Trans-Basic	1
10-660-112	Electronics 3: Op-Amps-Basic	1
10-660-113	Digital 4: ALU	1
10-660-114	Digital 5: Characteristics	1
10-660-115	Digital 6: Systems	1
10-801-197	Reporting-Technical	3
10-804-132	Math-Geometry/Analytic	3
SEMESTER TOTAL		16

THIRD SEMESTER

10-620-133	Transducers	3
	OR	
10-605-152	Measurement-Temp/Level	3
10-620-134	Electromech-Rotating Equip	3
	OR	
10-605-153	Instrumentation-Pneum	3
10-620-135	Fluid/Mechanical Systems	3
10-620-136	Computer/Machine Interface	3
10-801-196	Oral/Interpers Communication	3
	Elective	3
SEMESTER TOTAL		18

FOURTH SEMESTER

10-620-131	Electromechanical System	3
	OR	
10-605-151	Control System Techniques	3
10-620-142	Fluid Control Mechanism	3
	OR	
10-605-154	Measurement-Flow/Analy	3
10-620-148	Programmable Controls-Adv	3
10-809-199	Psychology-Human Rel	3
	Elective	3
SEMESTER TOTAL		15

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-605-151 CONTROL SYSTEM TECHNIQUES

...electronic/digital control loops; schematic diagrams; measurement and transmission instruments; and final control devices concerned with the connecting, interaction, tuning, and troubleshooting of loops. (Prerequisites: 10-605-152, Measurement-Temperature Level; 10-605-153, Instrumentation-Pneumatics)

10-605-152 MEASUREMENTS-TEMPERATURE/LEVEL

...theory of measurement and its application to mechanical and electrical devices used in measuring level and temperature; ultrasonic transmitters; RTDs, thermocouples, and head measuring devices. (Prerequisites: 10-660-109, AC 3:RLC Circuits; 10-660-112, Basic Electronics 3:Op-Amps)

10-605-153 INSTRUMENTATION-PNEUMATICS

...instrumentation diagrams, symbology, and mathematics; pressure measurement and compressed air systems; study of pneumatic transmitter, converter, and controller instruments as used in closed loop control. (Prerequisites: 10-660-109, AC 3:RLC Circuits; 10-660-112, Basic Electronics 3:Op-Amps)

10-605-154 MEASUREMENTS-FLOW/ANALYTICAL

...theory of measurement as applied to mechanical and electrical devices used in obtaining flow and analytical measurements such as pH, consistency, humidity, conductivity, and viscosity. (Prerequisites: 10-605-152, Measurement-Temperature Level; 10-605-153, Instrumentation-Pneumatics)

10-620-131 ELECTROMECHANICAL SYSTEMS

...feedback control analysis applied to servomechanical systems, and motor speed drives. (Prerequisites: 10-620-133, Transducers; 10-620-134, Electromechanical-Rotating Equipment; 10-620-136, Computer/Machine Interface)

10-620-133 TRANSDUCERS ...basic theory, operation, and application of industrial transducers, sensors, and detectors; installation, maintenance, and interfacing of various transducers. (Prerequisites: 10-660-109, AC 3:RLC Circuits; 10-660-112, Basic Electronics 3:Op-Amps; 10-660-115, Digital 6:Systems)

10-620-134 ELECTROMECHANICAL-ROTATING EQUIPMENT

...construction, characteristics, and operation of DC motors and AC motors; construction, operation, and set-up of motor drive systems. (Prerequisites: 10-660-109, AC 3:RLC Circuits; 10-660-112, Basic Electronics 3:Op-Amps; 10-804-132, Geometry Analytic)

10-620-135 FLUID/MECHANICAL SYSTEMS

...basic theory and operation of hydraulic and mechanical components and systems. (Prerequisite: 10-804-132, Geometry Analytic)

10-620-136 COMPUTER/MACHINE INTERFACE

...development and use of computer graphics applied to the monitoring, supervision, and control of industrial machinery. (Prerequisites: 10-660-115, Digital 6:Systems; 10-804-132, Geometry Analytic)

10-620-142 FLUID CONTROL MECHANISMS

...theory, operation, and tuning of electro-hydraulic servovalve and proportional valve systems. (Prerequisites: 10-620-133, Transducers; 10-620-135, Fluid/Mechanical Systems)

10-620-148 PROGRAMMABLE CONTROLLERS-ADVANCED

...advanced applications and programming of PLCs, with emphasis on the hardware and software needed to interface PLCs to industrial components and systems, including maintenance, installation, and specifications. (Prerequisites: 10-620-133, Transducers; 10-620-134, Electromechanical-Rotating Equipment; 10-620-135, Fluid/Mechanical Systems; 10-620-136, Computer/Machine Interface)

10-660-101 DIGITAL 1: LOGIC ...AND, OR, NOT, NAND, NOR, logic operation using switch logic, ladder logic, and gate logic. Simplification methods using Boolean theorems and Karnaugh Maps, and timing diagram analysis.

10-660-102 DIGITAL 2: SEQUENTIAL ...operation and connection of Latches, RS flip-flops, JK flip-flops, and D flip-flops using timing diagram analysis, and some simple applications are studied. (Corequisite: 10-660-101, Digital 1 Logic)

10-660-103 DIGITAL 3: REGISTERS ...analyze and design asynchronous up counters, down counters, presettable counters, ring counters, and Johnson counters, and analyze synchronous counters. Analyze and design various types of shift registers. (Corequisite: 10-660-102, Digital 2: Sequential)

10-660-104 DC 1: INTRODUCTION ...introduction to the concepts of DC electricity and simple series circuits. Voltage, Current, Resistance, Ohm's Law, Power and Kirchoff's Voltage Law are defined. (Prerequisite: 10-804-130, Algebra/Trigonometry)

10-660-105 DC 2: CIRCUITS ...analysis of parallel and series-parallel circuits. Application of Kirchoff's Current Law to parallel circuit combinations. Introduction of current sources and source conversions. (Corequisite: 10-660-104, DC 1: Intro)

10-660-106 DC 3: CIRCUIT THEOREMS ...analysis of circuits using various advanced methods.

Branch, loop, and node methods are studied. Eight network theorems are presented for the solution of circuit voltages and currents. (Corequisite: 10-660-105, DC 2: Circuits)

10-660-107 AC 1: PROPERTIES ...introduction to the properties of Capacitors and Inductors including types and behavior in switching circuits. Inductor basics include a study of magnetic fields. (Prerequisites: 10-660-105, DC 2-Circuits and 10-804-131, Algebra-Intermediate)

10-660-108 AC 2: REACTANCE ...study of the way inductive, capacitive and resistive components behave in a circuit excited by a sine waveform. Effective and average values of the sinewave are derived. (Corequisite: 10-660-107, AC 1:Properties)

10-660-109 AC 3: RLC CIRCUITS ...power flow in complex AC circuits based on resistive and reactive components. Description of the power triangle and power factor. Calculation of voltages and currents in complex AC circuits. (Corequisite: 10-660-108, AC 2: Reactance)

10-660-110 ELECTRONICS 1: DIODES-BASIC

...introduction to the characteristics and usage of semiconductor diodes in rectifiers and linear power supplies. Special diodes and diode circuits are also considered. (Corequisite: 10-660-107, AC 1: Properties)

10-660-111 ELECTRONICS 2: TRANSISTOR-BASIC

...introduction to the characteristics, bias, and usage of semiconductor transistors in amplifying circuitry. BJTs, JFETs, MOSFETs, and general amplifier characteristics are studied. (Corequisite: 10-660-110, Electronics 1: Diodes-Basic)

10-660-112 ELECTRONICS 3: OP-AMPS-BASIC

...introduction to the circuit characteristics of integrated operational amplifiers. The various connections, inverting, non-inverting, and comparator will be studied as well as specialized applications such as summers and filters. (Corequisite: 10-660-111, Electronics 2:Transistor-Basic)

Descriptions of courses not found on this page can be found in the back of the catalog.

Electronics

Program Code 106051

ASSOCIATE DEGREE - TWO YEARS

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5461. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Electronics prepares students to operate, test, maintain, and troubleshoot electronic equipment such as automatic control, computers, and communications equipment. It is also designed to prepare technicians to work with Electronic Research and Development engineers.

Graduates of the Electronics Program will be able to:

- Describe the various digital modulation techniques.
- Identify components of power switching devices and circuits.
- Evaluate power switching circuits.
- Program microprocessor interface circuits.
- Measure electrical parameters of RF circuits.
- Describe wireless analog communication techniques.
- Use computer assembly language.
- Measure wide-band circuit parameters.
- Describe transfer characteristics of frequency sensitive linear circuits.
- Analyze an ON/OFF machine control circuit.
- Describe the assembly and interconnections of a microprocessor system.
- Predict operation of circuits containing active components.
- Identify the component and appropriate nomenclature of basic electronic symbols.
- Apply boolean theorems to basic digital circuits.
- Apply circuit theorems to AC/DC RLC circuits.
- Use basic electronic tools.
- Work in teams.
- Develop an industry acceptable work ethic.
- Communicate orally using common technical terminology.
- Write a technical document.
- Use office suite software package tools.
- Manipulate electronic formulas.
- Relate mathematics to the field of electronics.
- Interpret graphical data.
- Solve problems using algebra, trigonometry, complex numbers, logarithms, and exponentials.
- Use common test equipment to measure circuit parameters.
- Verify measured values.
- Machine code a processor.
- Adhere to laboratory safety standards.
- Operate microprocessor interface circuits.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

MATH LEVEL

Students should have mastered algebra skills before entering this program. For a description of algebra skills, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as an Electronic Development Technician, Electronic Maintenance Technician, Electronic Test Technician, Electronics Technician, and Field Service Technician.

ELECTRONIC DEVELOPMENT TECHNICIAN:

assists engineers in the design and development of experimental and prototype electronic equipment and products.

ELECTRONIC MAINTENANCE TECHNICIAN:

services and programs in-plant automatic control equipment, computers, robots, and other electronic equipment.

ELECTRONIC TEST TECHNICIAN:

tests, troubleshoots, and inspects electronics products (quality control testing).

ELECTRONICS TECHNICIAN:

maintains electronic equipment including motor controllers, cables, communication equipment, computers, security systems, CNC equipment, programmable controllers, robots, and automatic production equipment; works with an electronics engineer in building breadboard and prototype devices; and evaluates and tests electronic devices and systems.

FIELD SERVICE TECHNICIAN:

services and overhauls equipment in the customer's facility; works with sales personnel; and demonstrates new equipment to potential customers.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Computer Field Service Supervisor
- Electronics Production Superintendent
- Electronics Maintenance Supervisor

EARNING POTENTIAL

Graduates of the Electronics program have the potential to earn over \$50,000 per year after five years of work experience.

CURRICULUM

The Electronics Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 65 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-605-110	Tech Skills 1	1
10-660-101	Digital 1: Logic	1
10-660-102	Digital 2: Sequential	1
10-660-103	Digital 3: Registers	1
10-660-104	DC 1: Introduction	1
10-660-105	DC 2: Circuits	1
10-660-106	DC 3: Circuit Theorems	1
10-801-195	Communication-Written	3
10-804-131	Math-Algebra/Inter	3
10-809-195	Economics	3
SEMESTER TOTAL		16

SECOND SEMESTER

10-605-120	Tech Skills 2	1
10-660-107	AC 1: Properties	1
10-660-108	AC 2: Reactance	1
10-660-109	AC 3: RLC Circuits	1
10-660-110	Electronics 1: Diodes-Basic	1
10-660-111	Electronics 2: Trans-Basic	1
10-660-112	Electronics 3: Op-Amps-Basic	1
10-660-113	Digital 4: ALU	1
10-660-114	Digital 5: Characteristics	1
10-660-115	Digital 6: Systems	1
10-801-197	Reporting-Technical	3
10-804-132	Math-Geometry/Analytic	3
SEMESTER TOTAL		16

THIRD SEMESTER

10-605-124	Microprocessors 1	3
10-605-136	Electronics-Linear	3
10-605-137	Data Communications 1	3
10-801-196	Oral/Interpers Communication	3
10-809-199	Psychology-Human Rel	3
	Elective	3
SEMESTER TOTAL		18

FOURTH SEMESTER

10-605-144	Microprocessors 2	3
10-605-147	Data Communications 2	3
10-605-148	Analog Communications	3
10-605-149	Power Devices	3
	Elective	3
SEMESTER TOTAL		15

SUGGESTED ELECTIVES: Internship (10-605-195), CAD-Electron Tech (10-606-101), Math 3-Tech Calc (10-804-170).

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-605-124 MICROPROCESSORS 1

...microprocessors using a microcontroller, assembly language programming and microprocessor architecture, digital information processing on the basic, machine level of a computer. (Prerequisites: 10-660-115, Digital 6 Systems; 10-660-112, Basic Electronics 3:Op-Amps)

10-605-136 ELECTRONICS-LINEAR

...active and passive linear circuits including filters, resonant and impedance matching circuits, and linear amplifiers using BJT and FET active element. (Prerequisites: 10-660-109, AC 3:RLC Circuits; 10-660-112, Basic Electronics 3:Op-Amps)

10-605-137 DATA COMMUNICATIONS 1

...circuits and principles in pulse amplitude, time, code modulation and delta modulation, sampling and noise effects using modulation techniques, and network concepts. (Prerequisites: 10-660-112, Basic Electronics 3: Op-Amps; 10-660-115, Digital 6:Systems)

10-605-144 MICROPROCESSORS 2

...programming and applying digital I/O and control devices: ADCs, DACs, Timers, Parallel interfaces, Serial Communication interfaces, and Interrupt handling. An extension of Microprocessors 1. (Prerequisite: 10-605-124, Microprocessors 1)

10-605-147 DATA COMMUNICATIONS 2

...NRZ, and Manchester encoding/decoding; principles of FSK, ASK, PSK, and noise effects on digital modulation; fiber optic principles, light, and a brief laser discussion. (Data Communications 1 extension.) (Prerequisite: 10-605-137, Data Communications 1)

10-605-148 ANALOG COMMUNICATIONS

...modulation principles including AM, FM, and SSB; noise influence on receiving systems, antenna characteristics, radiating fields, and high frequency propagation in feedlines. (Prerequisite: 10-605-136, Electronics-Linear)

10-605-149 POWER DEVICES ...use of power switching devices applied to switching systems such as power supplies, motor speed controls, power inverters, and UPS systems; production of DC from line sources and the losses in switching devices; students will calculate and measure phase angles, voltages, currents, and impedances using standard Ohm's Law concepts and laboratory measuring instruments. (Prerequisite: 10-605-136, Electronics-Linear)

10-660-101 DIGITAL 1: LOGIC ...AND, OR, NOT, NAND, NOR, logic operation using switch logic, ladder logic, and gate logic. Simplification methods using Boolean theorms and Karnaugh Maps, and timing diagram analysis.

10-660-102 DIGITAL 2: SEQUENTIAL ...operation and connection of Latches, RS flip-flops, JK flip-flops, and D flip-flops using timing diagram analysis, and some simple applications are studied. (Corequisite: 10-660-101, Digital 1 Logic)

10-660-103 DIGITAL 3: REGISTERS ...analyze and design asynchronous up counters, down counters, presetable counters, ring counters, and Johnson counters, and analyze synchronous counters. Analyze and design various types of shift registers. (Corequisite: 10-660-102, Digital 2: Sequential)

10-660-104 DC 1: INTRODUCTION ...introduction to the concepts of DC electricity and simple series circuits. Voltage, Current, Resistance, Ohm's Law, Power and Kirchoff's Voltage Law are defined. (Prerequisite: 10-804-130, Algebra/Trigonometry)

10-660-105 DC 2: CIRCUITS ...analysis of parallel and series-parallel circuits. Application of Kirchoff's Current Law to parallel circuit combinations. Introduction of current sources and source conversions. (Corequisite: 10-660-104, DC 1: Intro)

10-660-106 DC 3: CIRCUIT THEOREMS ...analysis of circuits using various advanced methods. Branch, loop and node methods are studied. Eight network theorems are presented for the solution of circuit voltages and circuits. (Corequisite: 10-660-105, DC 2: Circuits)

10-660-107 AC 1: PROPERTIES ...introduction to the properties of Capacitors and Inductors including types and behavior in switching circuits. Inductor basics include a study of magnetic fields. (Prerequisites: 10-660-105, DC 2-Circuits and 10-804-131, Algebra-Intermediate)

10-660-108 AC 2: REACTANCE ...study of the way inductive, capacitive, and resistive components behave in a circuit excited by a sine waveform. Effective and average values of the sinewave are derived. (Corequisite: 10-660-107, AC 1:Properties)

10-660-109 AC 3: RLC CIRCUITS ...power flow in complex AC circuits based on resistive and reactive components. Description of the power triangle and power factor. Calculation of voltages and currents in complex AC circuits. (Corequisite: 10-660-108, AC 2: Reactance)

10-660-110 ELECTRONICS 1: DIODES-BASIC ...introduction to the characteristics and usage of semiconductor diodes in rectifiers and linear power supplies. Special diodes and diode circuits are also considered. (Corequisite: 10-660-107, AC 1: Properties)

10-660-111 ELECTRONICS 2: TRANSISTOR-BASIC ...introduction to the characteristics, bias, and usage of semiconductor transistors in amplifying circuitry. BJTs, JFETs, MOSFETs, and general amplifier characteristics are studied. (Corequisite: 10-660-110, Electronics 1: Diodes-Basic)

10-660-112 ELECTRONICS 3: OP-AMPS-BASIC ...introduction to the circuit characteristics of integrated operational amplifiers. The various connections, inverting, non-inverting, and comparator will be studied as well as specialized applications such as summers and filters. (Corequisite: 10-660-111, Electronics 2:Transistor-Basic)

Descriptions of courses not found on this page can be found in the back of the catalog.

Emergency Medical Technician-Basic Program Code 305313

TECHNICAL DIPLOMA - ONE SEMESTER

Offered throughout the District. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5543. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Emergency Medical Technician-Basic students perform emergency patient care and basic life support in the field, transporting injured and ill patients to hospital emergency departments. Also performs care in hospital emergency departments.

Graduates of the Emergency Medical Technician-Basic Program will be able to:

- Apply preparatory aspects of emergency care.
- Perform airway management.
- Perform patient assessment.
- Manage medical, behavioral, and trauma patients.
- Adapt principles to pediatric cases.
- Perform field operations.

Successful program completion prepares and entitles the student to take the state license examination. A graduate is licensed only after successful completion of the licensing examination and application for a state license.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- Must be 18 years or older to enter training
- Satisfactory placement in the NWTC reading evaluation
- First priority for admission is given to applicants sponsored by a Wisconsin licensed ambulance service. Un-sponsored applicants are admitted only after the program is filled with sponsored students
- Proof of current health status and immunizations
- Background information disclosure form completion (or verification by ambulance service); {Wisconsin's Caregiver Law (1997 WISCONSIN ACT 27) requires a completed criminal background check prior to access to patients and/or children in clinical agencies/field sites used by this program. Based upon results of the criminal background check, a student may be denied access to clinical agencies/field sites and thus would not be able to complete the program. For the most current information on the Caregiver Law, visit this Web site: www.dhfs.state.wi.us}

EMPLOYMENT POTENTIAL

A graduate with an EMT-Basic Technical Diploma will have the potential for employment as an Emergency Medical Technician. Most ambulance services in Wisconsin are volunteer, but private ambulance services, fire departments, and hospital - based ambulance services employ EMTs in full-time paid positions. Some hospital emergency departments also employ EMTs.

EMERGENCY MEDICAL TECHNICIAN:

Performs emergency patient care and basic life support in the field, transporting sick and injured patients to hospital emergency departments. Also performs care in hospital emergency departments.

CURRICULUM

The EMT-Basic Technical Diploma is a one-semester program. Upon graduation, a student will have completed 4 credits.

FIRST SEMESTER

Course No.	Description	Credits
30-531-310	EMT-Basic	4
SEMESTER TOTAL		4

This program is not eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

30-531-310 EMT-BASIC ...preparatory aspects, airway management, patient assessment, medical/behavioral cases, trauma care, pediatric cases, and field operations in basic life-support emergency medical care.

Emergency Medical Technician-IV Program Code 305316

TECHNICAL DIPLOMA - ONE SEMESTER

Offered throughout the District. Admissions, registration, or counselor: (920) 498-5733. Course information: (920) 498-5543. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

EMT - I.V. Technician students are Wisconsin licensed EMT - Basics seeking to upgrade their skills to the I.V. Technician level. EMT - I.V. Technician students perform emergency patient care, basic life support, and limited advanced life support in the field, transporting injured and ill patients to hospital emergency departments. Also performs care in hospital emergency departments.

Graduates of the EMT - I.V. Technician Program will be able to:

1. Apply the preparatory aspects I.V. technician care.
2. Utilize a process of clinical decision-making when forming a field impression.
3. Demonstrate usage of basic pharmacology principles.
4. Perform intravenous therapy.
5. Demonstrate care of various medical emergency patients.
6. Perform clinical skill competencies.

Successful program completion prepares and entitles the student to take the state license examination. A graduate is licensed only after successful completion of the licensing examination and application for a state license.

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate with an EMT - I.V. Technician Diploma will have the potential for employment as an EMT - I.V. Technician with a Wisconsin ambulance service licensed to provide EMT - I.V. Technician level care. Most ambulance services in Wisconsin are volunteer, but private ambulance services, fire departments, and hospital - based ambulance services may employ EMT - I.V. Technicians in full-time paid positions. Some hospital emergency departments may also employ EMT - I.V. Technicians.

EMT - I.V. TECHNICIAN: performs emergency patient care, basic life support, and limited advanced life support in the field, transporting sick and injured patients to hospital emergency departments. Also performs care in hospital emergency departments.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- Must be 18 years or older to enter training
- Satisfactory placement in the NWTC reading evaluation
- Affiliation with a Wisconsin licensed ambulance service approved at the I.V. Technician level
- Current Wisconsin EMT-Basic license
- Current CPR recognition card
- Physician medical director endorsement of EMT skill competency
- Proof of current health status and immunizations
- Background information disclosure form completion (or verification by ambulance service); {Wisconsin's Caregiver Law (1997 WISCONSIN ACT 27) requires a completed criminal background check prior to access to patients and/or children in clinical agencies/field sites used by this program. Based upon results of the criminal background check, a student may be denied access to clinical agencies/field sites and thus would not be able to complete the program. For the most current information on the Caregiver Law, visit this Web site: www.dhfs.state.wi.us}

CURRICULUM

The EMT-I.V. Technical Diploma is a one-semester program. Upon graduation, a student will have completed 2 credits.

FIRST SEMESTER

Course No.	Description	Credits
30-531-340	EMT I.V. Technician	2
SEMESTER TOTAL		2

This program is not eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

30-531-340 EMT IV TECHNICIAN ...preparatory aspects, clinical decision-making, basic pharmacology, intravenous therapy, cardiovascular cases, diabetic cases, narcotic overdose cases, and clinical skill competencies in EMT I.V. Technician level emergency medical care.

Descriptions of courses not found on this page can be found in the back of the catalog.

Farm Business and Production Management

Program Code 300901

TECHNICAL DIPLOMA - SIX-YEAR, PART-TIME

Offered District-wide. Information in Green Bay: (920) 498-5457. Information in Marinette: (715) 732-3875. Information in Sturgeon Bay: (920) 746-4900. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Farm Business and Production Management covers basic farming production and business management principles needed to be an efficient farmer. Formal classes are delivered District-wide at locations convenient for the farmers.

Graduates of the Farm Business and Production Management Program will be able to:

- Calculate farm business cost of production for forage, grain, beef, pork, and milk.
- Prepare and assess a livestock management plan that is environmentally friendly.
- Prepare and assess a business financial plan.
- Develop and assess a soil and crop management plan that is environmentally friendly.
- Own, operate, and/or be employed in an agriculture-related industry.
- Implement a business, soil, crop, and livestock management plan that is environmentally friendly.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- Communications: ability to listen, write complete sentences, spell accurately, and express ideas well verbally
- Science: basic plant and animal biology, chemistry, and applied physics
- Ability to use computer operating skills: keyboarding at 30 words per minute
- Basic math defined as addition, subtraction, multiplication and division

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have basic skills necessary to own and operate or be employed on a farm.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Dairy Herdperson
- General Farm Manager
- Farm Records Manager
- Crop Supervisor
- Livestock Feeding Specialist
- Farm Equipment and Facilities Maintenance Manager
- Farm Service Employee
- Field Equipment Operator

CURRICULUM

The Farm Business and Production Management Technical Diploma is a six-year, part-time program. Upon graduation, a student will have completed 18 credits.

Course No.	Description	Credits
30-090-381	Farm Business Operation	3
30-090-382	Soils Management	3
30-090-383	Crop Mgmt	3
30-090-384	Livestock Nutrition	3
30-090-385	Livestock Mgmt	3
30-090-386	Farm Record/Busi Analy	3
SEMESTER TOTAL		18

This program is not eligible for financial aid.

Tuition assistance is available through the Wisconsin Dept. of Agriculture and the Wisconsin Technical College Categorical Funding Tuition Assistance Grant.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

30-090-381 FARM BUSINESS OPERATION ...farm organization; cash flow; financial statements and budgeting; credit needs; record keeping systems; business structure for farm operation; tax issues; farm business analysis; and decision making.

30-090-382 SOILS MANAGEMENT ...preparing and implementing a land use plan, soil testing procedures and reports, corrective fertilizers, soil conservation, safe use of farm machinery and equipment, and farm business analysis.

30-090-383 CROP MANAGEMENT ...economics, alternative crop strategies, production management, variety selection, maintenance fertilization, pest controls and chemicals, harvesting, storage, marketing, and farm business analysis.

30-090-384 LIVESTOCK NUTRITION ...sound feeding management; economics of feeds; nutritional terminology and requirements; feed consumption; feed tag labels for protein, energy, minerals, and vitamins; evaluate feeding programs; and metabolic diseases.

30-090-385 LIVESTOCK MANAGEMENT ...livestock selection; breeding management; herd health; young stock management; selection, operation, and maintenance of milking, feeding, ventilation, and manure handling systems; farm buildings; feed storage; and farm business analysis.

30-090-386 FARM RECORD/BUSINESS ANALYSIS ...farm business goals, use of farm credit, farm business arrangements, orderly farm transfer, farm estate planning, farm income taxes, computer records, and farm business analysis.



Descriptions of courses not found on this page can be found in the back of the catalog.

Financial Institutions Management Program Code 101028

ASSOCIATE DEGREE - FIVE YEARS, PART-TIME, WITH SHORTER OPTIONS AVAILABLE

Offered at the Green Bay campus. Admissions, registration, or counselor: (920) 498-5733.

Course information: (920) 498-5435. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Financial Institutions Management is designed for current or prospective employees of financial institutions seeking specialized training.

Graduates of this program will be able to:

- Perform business math calculations.
- Analyze business and personal financial documents.
- Ensure compliance with state and federal laws.
- Recommend appropriate financial products to customers.
- Use marketing tools and techniques.
- Manage the work of other people in a team environment.
- Assess the impact of economic trends on the financial industry.
- Use financial counseling techniques.
- Make loan decisions.
- Demonstrate knowledge and understanding of collection procedures.
- Deliver good customer service.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- Basic math
- Ability to use computer keyboard

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

The curriculum is structured to provide a climate for the development of the functional skills needed by participants from entry level through senior management.

The program was developed in coordination with American Bankers Association.

CURRICULUM

The Financial Institutions Management Associate Degree is a five-year, ten-semester program. Upon graduation, a student will have completed 68 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-102-151	Banking Principles	3
10-103-103	Micro Basics MS Office 1	3
10-804-101	Math-Business	3
SEMESTER TOTAL		9

SECOND SEMESTER

10-102-101	Financial Applications	3
10-102-122	Financial Inst-Mktg	3
SEMESTER TOTAL		6

THIRD SEMESTER

10-101-110	Accounting 1	4
10-104-113	Credit-Consumer	3
SEMESTER TOTAL		7

FOURTH SEMESTER

10-102-153	Finance-Personal	3
10-801-195	Communication-Written	3
SEMESTER TOTAL		6

FIFTH SEMESTER

10-102-150	Law-Business	3
10-801-196	Oral/Interpers Communication	3
SEMESTER TOTAL		6

SIXTH SEMESTER

10-102-160	Law-Credit	3
10-809-195	Economics	3
	Elective	3
SEMESTER TOTAL		9

SEVENTH SEMESTER

10-102-180	Money/Banking	3
10-196-110	Supervision Principles	3
SEMESTER TOTAL		6

EIGHTH SEMESTER

10-102-125	Mortgage Lend/Serv	3
10-809-197	Society-Amer Contemp	3
SEMESTER TOTAL		6

NINTH SEMESTER

10-102-155	Trust Functions/Service	3
10-809-199	Psychology-Human Rel	3
SEMESTER TOTAL		6

TENTH SEMESTER

10-102-167	Commercial Lending	3
10-196-143	Diversity-Workplace	1
	Elective	3
SEMESTER TOTAL		7

SUGGESTED ELECTIVES: Financial Statement Analysis (10-102-172), Collection Methods (10-102-165), Accounting 2 (10-101-120), Credit Management Seminar (10-104-144), Financial Counseling Techniques (10-102-174).

This program is fully eligible for financial aid.

COURSE DESCRIPTIONS

These courses provide an opportunity for students to develop the knowledge, skills, and understanding required for employment in this field.

10-102-101 FINANCIAL APPLICATIONS ...use of financial calculators, checkbook records, purchasing systems, shipping/receiving systems, A/R systems, A/P systems, business loans, breakeven analysis, sales gain/loss, depreciation methods, inventory methods, and financial statement analysis.

10-102-122 FINANCIAL INSTITUTIONS-MARKETING ...fundamental concepts of marketing and the application of these concepts; as financial institutions enter the electronic era, effective marketing will be critical in determining the course of the industry.

10-102-125 MORTGAGE LENDING/SERVICING ...principles and practices involved in making and closing mortgage loans and servicing a sound mortgage portfolio, including the secondary mortgage market.

10-102-150 LAW-BUSINESS ...common law contracts and sales contracts: formation, interpretation, performance, and discharge; the law of agency; corporations; and introduction to the American legal system: criminal and tort law, and global business issues.

10-102-151 BANKING PRINCIPLES ...U.S. banking history, organization, the Federal Reserve System, deposit functions, security issues, payment flow, credit functions, accounting, specialized services, marketing, and current issues and trends.

10-102-153 FINANCE-PERSONAL ...income and occupations, financial spending plan development, purchasing consumer goods and services, risk management plan development, investment plan development, retirement and estate planning, and financial advising.

10-102-155 TRUST FUNCTIONS/SERVICE ...trust functions; estate settlement; guardianships; trust services; performance of agencies, individuals, business organizations, charitable institutions; and trust administration.

10-102-160 LAW-CREDIT ...Uniform Commercial Code, credit regulations, Wisconsin Consumer Protection Law, collection law, and bankruptcy.

10-102-167 COMMERCIAL LENDING ...functions of the loan interview and credit investigation, elements of the loan document and its loan functions, the structuring of commercial loans, and federal and state laws governing commercial lending.

10-102-180 MONEY/BANKING ...economics and banking, commercial banking system, money supply, investments and loans, Federal Reserve System, and international monetary system.

10-104-113 CREDIT-CONSUMER ...the role of consumer credit, loan processes, collections; financial advising and counseling; loan, promotion, and bank policies; consumer, commercial, mortgage loans, and credit cards.

10-196-110 SUPERVISION PRINCIPLES ...supervisor's role, planning, problem solving, organizing/staffing/training/retraining employees, motivation, evaluating performance, challenging employees, teamwork, controlling work, discipline, productivity, quality, and diversity.

Descriptions of courses not found on this page can be found in the back of the catalog.

Fire Protection Engineering Technology Program Code 105033

ASSOCIATE DEGREE - TWO YEARS

Offered at the Marinette campus or with the first year at the Green Bay campus under the 1 + 1 Program. Admissions, registration, or counselor and course information: (715) 735-9361 or (920) 498-5733. Toll free: (800) 422-NWTC.

PROGRAM DESCRIPTION

Fire Protection Engineering Technology teaches students to design, install, and service automatic sprinkler, fire alarm, and special hazard fire suppression systems.

Graduates of the Fire Protection Engineering Technology Program will be able to:

- Analyze developments in the fire protection field.
- Produce fire protection drawings.
- Use written, technical, and oral presentations.
- Design fire protection systems.
- Use construction blueprints.
- Evaluate automatic sprinkler systems.
- Evaluate fire protection hazards.
- Troubleshoot electrical components of fire protection systems.
- Compare manual and automatic fire extinguishing systems and agents.
- Arrange fire detection, alarm, and control devices.
- Design automatic fire sprinkler systems.
- Test to NICET Level II in at least one subfield.
- Design special hazards systems.
- Observe how fire protection is viewed by the general public.
- Assemble systems cost information.
- Install, service, and inspect fire protection systems.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

MATH LEVEL

Students should have mastered basic math skills. For a description of basic math, see the Basic Education section of this catalog.

EMPLOYMENT POTENTIAL

A graduate of the program will have the potential for employment as a Fire Protection Systems Designer, Fire Protection Equipment Sales Representative, Fire Protection Systems Installer, and Industrial Safety Technician in the areas of automatic fire sprinklers, special hazards, and fire alarm systems.

FIRE PROTECTION SYSTEMS DESIGNER:

prepares designs and layout drawings of new detection and suppression systems for commercial, residential, and industrial applications.

FIRE PROTECTION EQUIPMENT SALES REPRESENTATIVE:

merchandises fixed and portable fire protection equipment for commercial, industrial, and residential applications.

FIRE PROTECTION SYSTEMS INSTALLER:

interprets the protection system design for on-site installation, operation, and maintenance of fire protection systems.

INDUSTRIAL SAFETY TECHNICIAN: assists the industrial safety manager in plant fire safety programs and procedures; and insures compliance with federal, state, and municipal codes and ordinances.

With additional education and/or work experience, graduates may find other opportunities for employment.

- Fire Protection Consultant
- Fire Protection Equipment Sales Manager
- Industrial Safety Manager
- Municipal Safety Manager
- Property Loss/Risk Management Specialist

The Fire Protection Engineering Technology program is available on a "1 + 1 basis" - one year at NWTC Green Bay or other Wisconsin Technical College to complete the general education requirements, followed by one year at the Marinette Campus to complete all fire protection courses.

This approach is designed to minimize commuting or relocation. Courses marked with * would comprise the first year's requirements. Electives may be taken in either year. Contact a counselor for details.

CURRICULUM

The Fire Protection Engineering Technology Associate Degree is a two-year, four-semester program. Upon graduation, a student will have completed 68 credits.

FIRST SEMESTER

Course No.	Description	Credits
10-503-111	Fire Protect Tech-Intro	2
10-503-113	Fire Extinguisher-Portable	2
10-503-123	Fire Tech-Blueprint Rdg	2
* 10-606-109	Drafting 1-Technical	2
* 10-606-115	CAD	3
* 10-801-196	Oral/Interpers Communication	3
* 10-804-120	Math-Tech Algebra	3
SEMESTER TOTAL		17

SECOND SEMESTER

10-503-120	Special Hazards Systems 1	3
10-503-126	Sprinkler Hydraulics-Auto	3
* 10-503-132	Fire Detection-Elec 1	3
10-503-136	Sprinkler Systems 1	2
10-503-180	Nicet-Basic	2
10-606-128	CAD-Fire Tech Advanced	1
* 10-801-195	Communication-Written	3
SEMESTER TOTAL		17

THIRD SEMESTER

10-503-128	Fire Alarm System Design	2
10-503-129	Fire Alarm Systems Application	1
10-503-135	Fire Detection-Elec 2	3
10-503-137	Sprinkler Systems 2	4
10-503-138	Hazard Analysis	3
* 10-809-199	Psychology-Human Rel Elective	3
		2
SEMESTER TOTAL		18

FOURTH SEMESTER

10-503-140	Special Hazards Systems 2	3
10-503-148	Technical Project	3
* 10-801-197	Reporting-Technical	3
* 10-809-197	Society-Amer Contemp Elective	3
		2
		2
SEMESTER TOTAL		16

*Indicates that an equivalent course is available at NWTC Green Bay or at other Wisconsin Technical Colleges under the 1 + 1 Program.

SUGGESTED ELECTIVES: NICET Advanced-Automatic Sprinklers (10-503-181), NICET Advanced-Special Hazards (10-503-182), and NICET Advanced-Alarms (10-503-183).

This program is fully eligible for financial aid.

Nursing-Associate Degree

Program Code 105101

ASSOCIATE DEGREE - TWO YEARS PLUS ONE SUMMER

Offered at the Green Bay and Marinette campuses. Information in Green Bay: (920) 498-5733. Information in Marinette: (715) 735-9361.

PROGRAM DESCRIPTION

Graduates plan, provide, and evaluate patient care. They act as liaisons between physicians, other health care workers, and the patient. They supervise other health care providers.

Graduates of the Nursing-Associate Degree program will be able to:

- Think critically.
- Communicate effectively.
- Administer therapeutic nursing interventions.
- Pass NCLEX-RN at or above the State or National average.
- Transfer credits from ADN to BSN programs.
- Obtain employment as a Registered Nurse.

REQUIREMENTS FOR PROGRAM ENTRY

NWTC requires an entrance skill inventory for all program students. Please see the Accuplacer section of this catalog for more information.

- High school diploma or equivalent
- One year of Biology and Chemistry, passed with a "C" grade or better
- Minimum standard composite score of 18 on the ACT assessment (if math or reading is 16 or below, remediation is required) or comparable score on Accuplacer exam
- Complete an interview or orientation
- Have satisfactorily completed a medical examination within three months before beginning the program
- All students are required to complete an American Heart Association Health Care Provider CPR course prior to program entry. Students are required to maintain a current CPR card on a one-year renewal cycle to comply with affiliating agency requirements.
- All students must successfully complete a DHFS approved Nursing Assistant course prior to Nursing Process 1.
- Prior to Nursing Process I (10-510-113), completion of Bio-organic Chemistry (10-806-163).

Wisconsin's Caregiver Law (1997 WISCONSIN ACT 27) requires a completed criminal background check prior to access to patients and/or children in clinical agencies/field sites used by this program. Based upon results of the criminal background check, a student may be denied access to clinical agencies/field sites and thus would not be able to complete the program. For the most current information on the Caregiver Law, visit this Web site: www.dhfs.state.wi.us

EMPLOYMENT POTENTIAL

A graduate of this program who becomes a Registered Nurse has the potential for employment as a Staff Nurse or Charge Nurse in a variety of health care settings.

STAFF NURSE: is responsible for making nursing diagnoses and treating human responses to actual and potential health problems in health care facilities and insurance areas.

CHARGE NURSE: assumes the same responsibilities of a Registered Nurse in addition to directing the work flow and coordinating and managing the provision of care for patients and other staff in a medical facility.

Graduates of this program are eligible to take the Wisconsin State Board Examination for licensure as a Registered Nurse (RN)

Graduates are eligible to apply for direct transfer of credit in the nursing programs at the University of Wisconsin and private colleges and universities.

Individuals with criminal records may be ineligible for licensure. Individuals with abuse records may be ineligible for employment in nursing homes.

MATH LEVEL

Students should have mastered basic math skills and Accuplacer tests for algebra. For a description of basic math, see the Basic Education section of this catalog.

NOTE: A student who does not meet the above requirements should consult an NWTC counselor about ways to meet deficiencies through testing or course work.

The Nursing-Associate Degree program is accredited by the National League for Nursing Accrediting Commission (NLNAC), and approved by the Wisconsin State Board of Nursing.

National League for Nursing
Accrediting Commission (NLNAC)
61 Broadway, New York, NY 10006
(212) 363-5555 x153, FAX (212) 812-0390

Wisconsin Board of Nursing
Dept. of Regulation & Licensing
1400 East Washington St.
P.O. Box 8935, Madison, WI 53708-8935
(608) 266-2112

CURRICULUM

Curriculum revisions are in progress to create alignment among all nursing programs in the Wisconsin Technical College System. New nursing courses will be offered, starting in the fall of 2004. Completion of a Nursing Assistant course will be required prior to admission in the Associate Degree Nursing program. You may view updated information on the new Associate Degree Nursing program on the NWTC Web site, www.nwtc.edu.

SUMMER SEMESTER

Course No.	Description	Credits
10-806-193	Anatomy/Physiology-General	4
SEMESTER TOTAL		4

FIRST SEMESTER

10-510-113	Nursing Process 1	3
10-510-114	Nursing Process 2	4
10-801-196	Oral/Interpers Communication	3
10-806-194	Anatomy/Physiology-Advanced	4
10-809-198	Psychology-Intro	3
SEMESTER TOTAL		17

SECOND SEMESTER

10-510-120	Nursing Process 3	4
10-510-122	Nursing Process 4	4
10-801-195	Communication-Written	3
10-806-197	Microbiology	4
10-809-190	Human Growth/Development	3
SEMESTER TOTAL		18

THIRD SEMESTER

10-510-132	Nursing Process 5	5
10-510-134	Nursing Process 6	2
10-510-136	Nursing Pharmacology-App	2
10-510-141	Nursing Process 7	5
10-809-196	Sociology-Intro	3
SEMESTER TOTAL		17

FOURTH SEMESTER

10-510-150	Nursing Process 8	4
10-510-152	Nursing Process 9	4
10-510-154	Nursing Process 10	2
	Elective	3
	Elective	3
SEMESTER TOTAL		16

SUGGESTED ELECTIVES: It is strongly encouraged for students who wish to transfer to a four-year university to complete Chemistry-Organic and Biological (10-806-199) as an elective.

FLEXIBLE LEARNING OPTION: A part-time evening/weekend track is available. This option is scheduled over an 11-semester, four-year period, including three summers. For details, please refer to the Part-time Nursing - Associate Degree brochure.

NOTE: No final grade lower than a C is acceptable in the nursing or natural science courses. A student must repeat the particular course with C or better final grade to continue in or graduate from this program. If the course is sequential, the successful retake must occur before continuing the sequence.

Licensed Practical Nurses may receive advanced standing for nursing courses in the first year of the program. Introduction to AD Nursing (10-510-111) must be taken concurrent with second-year nursing courses. Call (920) 498-5430 for information.

This program is fully eligible for financial aid.

