

**UNION COUNTY COLLEGE  
1033 SPRINGFIELD AVENUE  
CRANFORD, NEW JERSEY 07016**

**PROGRAM ANNOUNCEMENT**

1) Name of Institution and Date

**Union County College, April 09, 2007**

2) Title of Program and Degree Designation

**Automotive Technology Program, Associate in Applied Science**

3) Classification for Instructional Programs Code (CIP)

**47.0604- Automobile/Automotive Mechanics Technology/Technician**

4) Campus Site of Proposed Program

**Cranford Campus**

**1033 Springfield Avenue**

**Cranford, New Jersey 07016**

**Scotch Plains Campus**

**1776 Raritan Road**

**Scotch Plain, New Jersey 07076**

5) Proposed Starting Date

**Spring 2008**

6) Licensure Required

**72 credit hours is the number of hours dictated to satisfy the technician certification and licensing requirements of the A.S.E. (National Institute for Automotive Service Excellence) as well as the course and program requirements set by the N.A.T.E.F. (National Automotive Technicians Education Foundation).**

7) Articulation Agreements/Transferability of Courses

**This program is designed to prepare students for employment immediately after completion of degree requirements.**

8) Accreditation

**At present there is no appropriate program-specific accreditation for an AAS degree program in Automotive Technology.**

## **AUTOMOTIVE TECHNOLOGY PROGRAM**

### **DESCRIPTIVE INFORMATION**

#### **I. OBJECTIVES**

The Automotive Technology Program is a cooperative program between Union County Vocational-Technical School and Union County College. All courses are taught by UCC faculty. The AUT professors are ASE certified. The AUT courses will be offered only on the Scotch Plains campus of UCC at the state-of-the-art automotive facility of the Vocational-Technical School.

Over the past decade, automotive technology has exponentially increased in complexity and sophistication, often requiring the Automotive Service Technician to have formal postsecondary education to gain access to employment in the industry. The A.A.S. degree in Automotive Technology will provide a means for students to acquire the technical skills, the communication skills and the analytic skills demanded by employers for entry-level positions.

The Automotive Technology Program is a competency-based course of study designed to train and prepare the serious student in eight automotive areas: Brakes, Steering & Suspension, Electrical & Electronic Repair, Engine Performance, Engine Repair, Manual Drive Trains, Heating & Air Conditioning, and Automatic Transmissions. Eligible Auto Technology students may participate in work activities such as internships, mentoring, apprenticeships and Cooperative Industrial Education.

At the completion of the program, students should be able to demonstrate:

- The ability to apply theory and hands-on practices to each of the eight ASE areas covered within the Automotive Technology Curriculum.
- The ability to perform automotive repair methods to business and industry standards.
- The ability to use computer-based software programs to generate information, technical service bulletins and procedures to properly diagnose and repair automobiles.
- The ability to use logical and critical thinking skills to diagnose an automotive complaint or problem.
- The ability to develop skills required for employment in the automotive industry.
- The ability to attain ASE certification and repair licensing needed within the Automotive Technology field.

#### **II. NEED/JUSTIFICATION**

The US Department of Labor projects employment of automotive service technicians and mechanics is expected to increase about as fast as the average population through the year 2012. Over the 2002-12 period, population growth will boost demand for motor vehicles, which will require regular maintenance and service. It is expected that jobs for graduates of post secondary programs in this industry will be in demand. Currently many graduates of the Union County Vocational-Technical Institute transfer into Brookdale Community College's Automotive Technology Program to finish their AAS degree.

### III. RELATIONSHIP TO THE MASTER PLAN AND PRIORITIES

This program is consistent with the planning initiatives of community colleges to

- Increase career based programs for non-transfer students.
- Offer programs to meet the needs of the community.
- Initiate new programs to meet emerging need.

This program is consistent with the Institutional Strategic Plan which calls for the development of new academic programs as a method of enhancing academic program offerings for students at the college. Additionally, the Institutional Master Plan calls for active responses on the part of the college to labor and other employment demands in the county, state and Northeast region in general.

### IV. SIMILAR PROGRAMS

A similar program is currently offered at Brookdale Community College, Camden Community College, Gloucester Community College and Mercer Community College.

### V. STUDENT ENROLLMENTS

Anticipated Enrollments			
YEAR 1	20	YEAR 3	40
YEAR 2	30	YEAR 4	50

### VI. PROGRAM RESOURCES

Additional Resources Needed to Implement the Program	
Full-Time Faculty	None.
Adjunct Faculty	Adjunct faculty to teach the Automotive Courses will be hired in cooperation with Union County Vocational-Technical Institute.
Computer Equipment	No new computer equipment is needed.
Additional materials	Marketing materials such as posters and brochures will need to be developed.

### VII. GENERAL EDUCATION COURSE DESCRIPTIONS (20 Credits required for AAS Degree)

#### COMMUNICATIONS (9 credits)

ENG101	English Composition I	3 credits
ENG122	Introductory Technical & Business Writing	3 credits
ENG128/129	The Dynamics of Communication or Public Speaking	3 credits

#### HUMANITIES (3 credits)

HUM	Humanities Elective	3 credits
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#### MATHEMATICS/SCIENCE/TECHNOLOGY (6 credits)

CIS 101	Introduction to Computer Applications	3 credits
MAT 119	Algebra	3 credits

#### SOCIAL SCIENCE (3 credits)

BUS 105	Organization & Management	3 credits
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## **VIII. NEW COURSE DESCRIPTIONS IN AUTOMOTIVE TECHNOLOGY**

### **COURSE NUMBER & NAME: AUT 100 AUTOMOTIVE FUNDAMENTALS**

**LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits

**PREREQUISITES:** NONE

**COREQUISITES:** NONE

#### **COURSE DESCRIPTION:**

This course is an introduction to basic automotive fundamentals. Students will be taught safety, computer software and information retrieval from service manuals and business based software programs, basic hand tools, power tools, specialty tools, and their uses and applications. Fasteners and thread repair techniques will also be covered. Basic car component identification, services, and maintenance will also be presented to the students. This is an introduction course to familiarize new students with no prior automotive background and is a requirement before entering the Automotive Technology Program. The ability to test out of this course will be offered to students with prior automotive experience.

### **COURSE NUMBER & NAME: AUT 101 STEERING/SUSPENSION SYSTEMS**

**LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits

**PREREQUISITES:** NONE

**COREQUISITES:** NONE

#### **COURSE DESCRIPTION:**

This course is designed to teach the principles of automotive steering/suspension systems and wheel alignment. Basic tire construction, ratings, repairs, dismounting and mounting procedures are covered. Static and dynamic wheel balancing procedures will finish the tire segment. This program will cover fundamentals of short/long-arm, and strut suspension which includes the components that are individually part of the suspension systems and how they operate. Various steering linkage systems, components, operation, differences between manual and power steering and how they apply to steering, suspension, and four wheel alignment will be discussed. The basics of two and four wheel alignment and the related geometry will be taught to the students during the wheel alignment segment of the course. Students will learn strategy-based diagnostic routines, in order to interpret and verify customer concerns and to perform tests to determine the causes of problems. Students will perform hands on repairs related to tires, steering and suspension components as well as actual wheel alignments.

**COURSE NUMBER & NAME: AUT 102 MANUAL DRIVE TRAINS****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** NONE**COREQUISITES:** NONE**COURSE DESCRIPTION:**

This course covers the manual drive train and the components that are individually part of it. Covered are front wheel, rear wheel drive, four wheel drive, and all wheel drive transmissions systems. The power delivery to the wheels through the clutch, transmission, differential and drive shafts are part of this course. Theory, noise diagnostics and overhaul procedures will be covered within this phase. Constant velocity axles and drive shaft overhaul will be covered as well. Included within this module will be a section on diagnostics, noise, and vibration causes and repairs.

**COURSE NUMBER & NAME: AUT 103 BRAKE SYSTEMS****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** NONE**COREQUISITES:** NONE**COURSE DESCRIPTION:**

The brake course prepares the student to diagnose and repair brake systems in the automotive field. This course builds upon the essential laws of physics, motion, forces, hydraulics, thermodynamics, and chemical reactions, and how these principles apply to the operation of the automotive brake system. The course will cover the energy conversion of motion changed to heat energy (when brakes are applied,) the effects of weight and speed on braking and stopping distance, thermal expansion, friction, force, and coefficient of friction, as they apply to braking systems. The course covers the fundamentals and service of disc/drum brakes; including, how they operate, brake-fluid properties, diagnosis, component replacement/repair/adjustment, disc/drum machining, power-assist units, and the fabrication (double flaring) of brake lines. The student will learn strategy-based diagnostic routines for interpreting and verifying customer concerns and proper operation. Through the inspection, testing, or measurement of component(s) operation, the student will learn to apply this knowledge to determine needed repair(s) and to implement the repair(s).

**COURSE NUMBER & NAME: AUT 121 AUTOMOTIVE ELECTRICAL 1****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** NONE**COREQUISITES:** NONE**COURSE DESCRIPTION:**

This ASE certified course is a basic automotive electrical course designed to cover the theory of electricity. The course will cover the basic applied electrical principles, basic component operation such as bulbs, relays, diodes, magnetism, and test equipment, moving toward chemical development of electricity (the battery) and the development of electromagnetism in its applied use in the starting and charging of systems.

**COURSE NUMBER & NAME: AUT 122 AUTOMOTIVE A/C & HEATING****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** NONE**COREQUISITES:** AUT 121 Automotive Electrical 1**COURSE DESCRIPTION:**

This course is designed to introduce the student to the basic theories and principles of refrigeration and their applications in the automotive air conditioning and heating system. The student will study the basic theories and principles of refrigerant, safety and environmental concerns, and the related tools and equipment needed to service these systems. The student will learn the associated electrical system controls and operations that allow air delivery, filtration, and temperature control into the automobile. The cooling system in relation to the heating system of the automobile will be covered. The student will perform related hands-on tasks to recharge, evacuate, purge, and diagnose heating and A/C problems. Included in this course will be the information and test for handling automotive refrigerant.

**COURSE NUMBER & NAME: AUT 131 AUTOMOTIVE ENGINE PERFORMANCE 1****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** NONE**COREQUISITES:** AUT 121 Automotive Electrical 1**COURSE DESCRIPTION:**

This ASE certified based course is an introduction to the basic interrelationship of the engine, ignition, fuel, and exhaust systems that is called engine performance. This course will cover the basics of the ignition system, basic engine operation, basic fuel and its delivery. The byproduct of their united functions which is exhaust and emissions will be discussed. Basic diagnostics and maintenance of these systems will be taught.

**COURSE NUMBER & NAME: AUT 201 ENGINE REPAIR****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** NONE**COREQUISITES:** NONE**COURSE DESCRIPTION:**

This course is designed to introduce the student to engine construction, diagnosis, and repair/rebuilding procedures. The student will learn the basic construction and operation of a four stroke engine, types, classifications, and ratings. Components, hardware, and service tools that are part of the short block assembly and valve train will be discussed. Engine sub systems; cooling, lubrication, starting, fuel, and emissions will be included within engine repair. Engine overhaul procedures and common engine mechanical repairs will be taught during this phase. An engine teardown, measurement, analysis, and reassembly will be a requirement of the course. Diagnosis and troubleshooting engine mechanical problems will be covered in this phase.

**COURSE NUMBER & NAME: AUT 202 AUTOMOTIVE ELECTRICAL 2****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** AUT 121 Automotive Electrical 1**COREQUISITES:** AUT131 Engine Performance 1**COURSE DESCRIPTION:**

This course will build on the basic applied electrical principles from Automotive Electrical 1, and apply them to individual systems of the automobile. A diagnostic strategy will be developed to allow the student to be able to diagnose and repair electrical problems. The horn, lighting, wiper and washer systems will be covered as well as dash instrumentation and motorized accessories within the automobile. The applied use of electrical test equipment will be mandatory during this phase.

**COURSE NUMBER & NAME: AUT 203 AUTOMATIC TRANSMISSION****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** AUT 102 Manual Drive Trains**COREQUISITES:** NONE**COURSE DESCRIPTION:**

This course is an introduction to automatic transmissions and transaxles. Applying the previously learned information from Manual Drive Trains, Automatic Transmissions will cover the hydraulic principles and the components that allow this transmission to shift automatically. Mechanical components, fluid transfer, circuitry, and testing will be part of this course. Pressure testing and overhauling a transmission will be a requirement. Electronic transmission shifting, lock-up, and diagnostics through a scanner will be covered.

**COURSE NUMBER & NAME: AUT 223 AUTOMOTIVE ELECTRICAL 3****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** AUT 103 Brake Systems; AUT 101 Steering/Suspension; AUT 202 Automotive Electrical 2.**COREQUISITES:** NONE**COURSE DESCRIPTION:**

This course will cover the differences between automotive electricity and automotive electronics specializing in the electronic controls within the automobile. Different electronic waveforms and the test equipment to monitor them will be discussed. Diagnostic procedures and computer flow chart diagnostics will enable the student to test electronic modules and sensors within the automobile. Anti-lock brake, air bag, and other specialized electronic systems will be part of this course. New electronic technology will be introduced in this phase as it is developed.

**COURSE NUMBER & NAME: AUT 232 AUTOMOTIVE ENGINE PERFORMANCE 2****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** AUT 131 Engine Performance 1**COREQUISITES:** AUT 202 Automotive Electrical 2**COURSE DESCRIPTION:**

This course will build on the introduction of engine performance by expanding each of the sections for more in-depth coverage of the new systems on an automobile. Course coverage will include various electronic ignition systems, fuel injection systems, and computer controls that affect emissions. An introduction to OBD 1 and OBD 2 systems will also be covered. Diagnostics and repair of these systems with computer-based technology will enhance this course.

**COURSE NUMBER & NAME: AUT 233 AUTOMOTIVE ENGINE PERFORMANCE 3****LECTURE/LAB HOURS:** 3 Lecture Hours, 3 Lab Hours, 4 Credits**PREREQUISITES:** AUT 232 Engine Performance 2**COREQUISITES:** AUT 223 Automotive Electrical 3**COURSE DESCRIPTION:**

This course will take the information provided in Engine Performance 1 and 2 and relate them to advanced engine performance diagnostics. Students will develop a diagnostic process with the use of test equipment to prepare them to be emission repair technicians. Following a New Jersey approved curriculum for emission repairs, the student should be able to take the New Jersey emission repair technician certification test. The balance of the course will be practicing the requirements of the New Jersey inspector license with the goal of obtaining the New Jersey inspector certificate.



## IX. PROPOSED CURRICULUM IN AUTOMOTIVE TECHNOLOGY ASSOCIATE IN APPLIED SCIENCE DEGREE

Recommended Course Sequence:

### First Year

1st Semester <sup>1</sup>		Description	Lecture	Lab	Credits
AUT	101	<b>STEERING/SUSPENSION SYSTEMS</b>	3	3	4
AUT	103	<b>BRAKE SYSTEMS</b>	3	3	4
BUS	105	Organization & Management	3	0	3
ENG	101	English Composition I <sup>2</sup>	3	0	3
MAT	119	Algebra <sup>3</sup>	3	0	3
					17

### 2<sup>nd</sup> Semester

AUT	102	<b>MANUAL DRIVE TRAINS</b>	3	3	4
AUT	121	<b>AUTOMOTIVE ELECTRICAL 1</b>	3	3	4
AUT	122	<b>AUTOMOTIVE A/C &amp; HEATING</b>	3	3	4
AUT	131	<b>AUTOMOTIVE ENGINE PERFORMANCE 1</b>	3	3	4
ENG	122	Introductory Technical & Business Writing	3	0	3
					19

### Second Year

#### 3<sup>rd</sup> Semester

AUT	201	<b>ENGINE REPAIR</b>	3	3	4
AUT	202	<b>AUTOMOTIVE ELECTRICAL 2</b>	3	3	4
AUT	232	<b>AUTOMOTIVE ENGINE PERFORMANCE 2</b>	3	3	4
CIS	100	Introduction to Computer Applications	2	2	3
HUM	ELE	Humanities Elective	3	0	3
					18

#### 4<sup>th</sup> Semester

AUT	203	<b>AUTOMATIC TRANSMISSION</b>	3	3	4
AUT	223	<b>AUTOMOTIVE ELECTRICAL 3</b>	3	3	4
AUT	233	<b>AUTOMOTIVE ENGINE PERFORMANCE 3</b>	3	3	4
ENG	128/ 129	The Dynamics of Communication or Public Speaking	3	0	3
ADM	140	Customer Service	3	0	3
					18

Total Credit Hours =72 <sup>4</sup>

### Notes:

- <sup>1</sup> AUT 100 (3 lec-3 lab-4 credits) must be taken as a co/prerequisite or test out by permission of the Automotive Coordinator.
- <sup>2</sup> Course determined by English Placement test.
- <sup>3</sup> Course determined by Math Placement test.
- <sup>4</sup> 72 credit hours is the number of hours dictated to satisfy the technician certification and licensing requirements of the A.S.E. as well as the course and program requirements set by the N.A.T.E.F.

## X. UCC 101

UCC 101 First Year Seminar may be required.

## XI. BIBLIOGRAPHY

In addition to the texts and supplemental materials listed for each proposed AUT course, the following references are relevant to the Automotive Technology program:

Brady, Robert N. *Automotive Electronics and Computer Systems*. Upper Saddle River, New Jersey: Prentice Hall, 2001.

Dales, Davis N. *Automotive Electronics and Engine Performance*. Upper Saddle River, New Jersey: Prentice Hall, 2000.

Halderman, James D. *Automotive Engines*. Upper Saddle River, New Jersey: Prentice Hall, 2001.

Duffy, James E. *Auto Engines Technology*. Tinley Park, Illinois: Goodheart-Willcox Company, 2000.

Johanson, Chris and James E. Duffy. *Automatic Transmissions & Transaxles*. Tinley Park, Illinois: Goodheart-Willcox Company, 2002.

Dales, Davis N. and Frank J. Theissen. *Automotive Drive Trains*. Upper Saddle River, New Jersey: Prentice Hall, 2000.

### Websites:

<http://www.asecert.org/>

<http://www.natef.org/>

<http://www.ccar.com/>

<http://www.atechtraining.com/>

<https://www.eyes.org/>

<http://mitchell-on-demand.maestrocortador.com/>

<http://www.ammcoats.com/>

<http://www.napaonline.com/>

### Publications:

*Tomorrow's Technician*. Babcox Publication.

*Toyota Tech*. Toyota Publications.

*EDGE*. DWD General Motors Publications.

*Expresstech*. Honda Publication.

*Endwrench*. Subaru Publications.

*Robinair Engineering*.

*Hunter Engineering*.

## XII. CORRELATION GRID

Automotive Technology Program Goals	Objectives	Assessment of Outcomes
Student will demonstrate the ability to perform automotive repair methods to business and industry standards.	<ul style="list-style-type: none"> <li>• Be able to perform automotive repair methods to business and industry standards.</li> </ul>	<ul style="list-style-type: none"> <li>• Properly write-up problem as stated by customer.</li> <li>• Properly diagnose problem.</li> <li>• Properly prepare repair plan.</li> <li>• Properly implement repair plan.</li> </ul>
Student will demonstrate the ability to use a computer-based software program to generate information, technical service bulletins and procedures to properly diagnose and repair automobiles.	<ul style="list-style-type: none"> <li>• Be able to use a computer-based software program to generate information, technical service bulletins and procedures to properly diagnose and repair automobiles.</li> </ul>	<ul style="list-style-type: none"> <li>• Use the internet to locate technical service bulletins and procedures.</li> <li>• Perform computer-based diagnostic procedures.</li> <li>• Use computer-based software to aid in repair.</li> </ul>
The ability to apply theory and hands-on practices to each of the eight ASE areas covered within the Automotive Technology Curriculum.	<ul style="list-style-type: none"> <li>• Be able to apply theory and hands-on practices to each of the eight ASE areas covered within the Automotive Technology Curriculum.</li> </ul>	<ul style="list-style-type: none"> <li>• Give detailed written answers to theoretical questions on exams in each of the eight ASE areas.</li> <li>• Give detailed written answers to procedural questions on exams in each of the eight ASE areas.</li> <li>• Follow hands-on procedures as required from each of the eight ASE areas.</li> </ul>
Student will demonstrate the ability to use logical and critical thinking skills to diagnose an automotive complaint or problem.	<ul style="list-style-type: none"> <li>• Be able to use logical and critical thinking skills to diagnose an automotive complaint or problem.</li> </ul>	<ul style="list-style-type: none"> <li>• Write a detailed diagnostic report based on the automotive complaint.</li> <li>• Prepare a repair plan based on the diagnostic report.</li> <li>• Provide documentation to support the repair plan.</li> </ul>
Student will demonstrate the ability to develop skills required for employment in the automotive industry.	<ul style="list-style-type: none"> <li>• Be able to develop skills required for employment in the automotive industry.</li> <li>• Be able to communicate effectively with others in diagnosing and repair of problems.</li> <li>• Be able to interview for a job at an automobile dealer or service facility.</li> </ul>	<ul style="list-style-type: none"> <li>• Write a resume.</li> <li>• Write a detailed set of repair instructions.</li> <li>• Verbal presentation of the diagnosis and repair of a problem.</li> <li>• Participate in a job interview.</li> </ul>
The ability to attain ASE certification and repair licensing required within the Automotive Technology Field.	<ul style="list-style-type: none"> <li>• Be able to attain ASE certification and repair licensing in the eight ASE areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Answer ASE practice test questions.</li> <li>• Perform required hands-on activities for ASE certification.</li> <li>• Take the ASE certification exams.</li> </ul>