



# NASHUA COMMUNITY COLLEGE

## COURSE OUTLINE FORM

<b>Course Title: Internal Combustion Engine</b>			
<b>Course Prefix &amp; No.: AUTO106N</b>	<b>Lecture Hours: 2</b>	<b>Lab Hours: 3</b>	<b>Credit Hours: 3</b>
<b>Department: Transportation Technology</b>			
<b>Program: Automotive Technology</b>			
<b>Revision Date: 12/2021</b>			

### **Prerequisites/ Co-requisites:**

Admission into the Automotive Technology Program

### **Required Accuplacer Score:**

### **Entrance Skills:**

- A minimum of one year of high school Algebra I is recommended
- Basic skills in written English are required
- Basic reading skills are required
- Basic computer skills are required
- Students are expected to possess a good work ethic and a strong desire to learn.
- A valid motor vehicle driver's license is required

**Catalog Description:**

This course examines 2 and 4 stroke engines, their operating systems, and related physical properties. Principals from basic carburation to variable cam timing, forced induction and performance parts are covered. The lab element of this course exposes the students to the construction methods, precision measurements, and tolerances related to engine design. It also covers basic diagnostics of a 4 stroke engine.

**Course Competencies:**

<b>Competency (Knowledge and Skills)</b>	<b>Critical Thinking Level</b>	<b>Linked to Program Outcome(s) #</b>
Students will be able to:		
1. Identify design and manufacturing techniques of automotive engines	Identify	
2. Understand the physical properties of energy conversion	Identify	
3. Explain the combustion principles of 2 and 4 stroke engines, gasoline and diesel	Identify	
4. Identify the operating systems of gasoline and diesel engines	Identify and relate	
5. Identify the internal components of an internal combustion engine	Identify	
6. Develop a sense of precision fit of engine components	Analyze and compare	
7. Use precision measurement tools to measure the internal components of an internal combustion engine	Apply and analyze	
8. Diagnose no-start condition of single cylinder engines	Analyze	

## Course Outline:

Content Topic	Subtopics ( a., b., etc.)
Introduction	
Introduction	<ol style="list-style-type: none"><li>a. Safety</li><li>b. Hardware</li><li>c. Torque wrench</li></ol>
Internal combustion engine	<ol style="list-style-type: none"><li>a. Operation</li><li>b. Construction</li><li>c. Classifications</li><li>d. Size and measurements</li></ol>
Top end	<ol style="list-style-type: none"><li>a. Cylinder heads and components</li><li>b. Valve train</li><li>c. Cam timing</li><li>d. Variable cam timing</li><li>e. To include performance timing</li></ol>
Bottom end	<ol style="list-style-type: none"><li>a. Block</li><li>b. Crank</li><li>c. Connection rods</li><li>d. Piston and rings</li><li>e. To include performance parts</li></ol>
Intake and exhaust systems	<ol style="list-style-type: none"><li>a. Manifold designs</li><li>b. Air flow requirements</li><li>c. To include performance modifications</li></ol>
Forced induction	<ol style="list-style-type: none"><li>a. Turbochargers</li><li>b. Blowers/supercharges</li><li>c. Nitrous</li><li>d. To include OEM and Aftermarket</li></ol>
Fuel fundamental	<ol style="list-style-type: none"><li>a. Petroleum and alternative fuels</li><li>b. Basic fuel systems</li></ol>
Ignitions systems	<ol style="list-style-type: none"><li>a. Introduction to ignition systems</li></ol>

## Performance Evaluation:

Formative Assessments	Summative Assessments
1. Lab participation grade 2. Classroom participation 3. Quizzes 4. Midterm exam 5. Homework assignments, reading	1. Final exam 2. Lab practical exam

## Method of Instruction:

1. Lecture and discussion
2. Required reading
3. Demonstration
4. Laboratory work

## Instructional Facilities:

Instructional facilities required for this course include:

1. A traditional classroom with working audio/visual equipment.
2. Lab space including work benches 1 per every 2 students
3. Single cylinder engines, 1 per every 2 students

## Revision History:

September, 2006 Roland Gies  
September, 2008 Roland Gies  
September, 2012 Roland Gies  
March, 2013 Roland Gies  
January, 5, 2017 Tim Hogan  
December 2021 Jason Felton

Will this course be taught online? Yes \_\_\_ No X

If yes, please complete the Online Course Outline Form.



**NASHUA COMMUNITY COLLEGE**  
**COURSE OUTLINE FORM**

<b>Course Title: AUTOMOTIVE ELECTRICITY AND WIRING</b>			
<b>Course Prefix &amp; No.: AUTO113N</b>	<b>Lecture Hours: 2</b>	<b>Lab Hours: 3</b>	<b>Credit Hours: 3</b>
<b>Department: Transportation Technology</b>			
<b>Program: Automotive Technology</b>			
<b>Revision Date: 12/2021</b>			

**Prerequisites/ Co-requisites:**

Admission into the Automotive Technology program

**Required Accuplacer Score:**

**Entrance Skills:**

- A minimum of one year of high school Algebra I is recommended.
- Basic skills in written English are required.
- Basic reading skills are required.
- Basic computer skills are required.
- Students are expected to possess a good work ethic and a strong desire to learn.
- A valid motor vehicle driver's license is required.

**Catalog Description:**

This course will cover the theory of automotive electrical systems and the diagnosis and troubleshooting of these systems. Wiring procedures, reading wiring diagrams, and repair techniques for electrical harness and components. Starting and charging systems will be covered.

**Course Competencies:**

<b>Competency (Knowledge and Skills)</b> Students will be able to:	<b>Critical Thinking Level</b>	<b>Linked to Program Outcome(s) #</b>
1. How electricity is created and the relationships between electrical voltage, current flow and electrical resistances.	Recognize	
2. The theory of automotive electrical systems and the diagnosis and troubleshooting of these systems.	Recognize, apply and analyze	
3. Wiring procedures, reading wiring diagrams, and repair techniques for electrical harness and components.	Recognize, apply and analyze	
4. Understand basic electrical principles as applied to the different types of circuits.	Recognize, apply and analyze	
5. To be able to analyze circuits using Ohm's Law and related formulas.	Apply and analyze	
6. To become proficient at reading wiring diagrams and service manuals.	Identify and analyze	
7. To develop skill in the use of electrical test equipment.	Identify and analyze	
8. To build experience and competence in the troubleshooting of electrical problems on vehicles.	Apply and analyze	
9. Demonstrate knowledge of the design and function of starting and charging systems	Apply and analyze	
10. To develop safe working habits and respect for equipment and shop management.	Identify and apply	

## Course Outline:

<b>Content Topic</b>	<b>Subtopics ( a., b., etc.)</b>
Introduction and Shop safety	a. Battery safety b. Electrical safety
Electrical Fundamentals	a. What is electricity b. Conventional Theory, Electron Theory c. Ohm's law, Watt's Law d. Conductors, insulators, and semi-conductors
Wire and Harness Repair	a. Soldering b. Crimping c. Splicing d. Basic electrical tools
Digital Multimeters	a. Measuring resistance, voltage and current b. Continuity testing c. Voltage drop testing
Series Circuits, Parallel circuits, and Series Parallel Circuits	a. Identifying circuit types b. Applying Ohm's Law to circuits
Reading and Understanding Wiring Diagrams	a. Using online service info systems to access wiring schematics b. Using and understanding printed schematics
Battery Testing and Service	a. Battery testing, load testing b. Impedance testers c. Battery and terminal service
Starting System Design and Diagnosis	a. Starter design and operation b. Starting system design c. Diagnosis and repair procedures
Charging System Design and Diagnosis	a. Alternator design and operation b. Charging system design c. Diagnosis and repair procedures

## Performance Evaluation:

<b>Formative Assessments</b>	<b>Summative Assessments</b>
<ol style="list-style-type: none"><li>1. Lab participation grade</li><li>2. Classroom participation</li><li>3. Quizzes</li><li>4. Midterm exam</li><li>5. Homework assignments, reading</li></ol>	<ol style="list-style-type: none"><li>1. Final exam</li><li>2. Lab practical exam</li></ol>

## Method of Instruction:

1. Lecture and discussion
2. Required reading
3. Demonstration
4. Laboratory work

## Instructional Facilities:

For this course a traditional classroom with working audio/visual equipment is required as well as working lab space in the automotive lab. Access to both a lab classroom with benches and main shop space with lifts is required for this class.

## Revision History:

February, 2008 Brian Creegan  
April, 2013 Brian Cregan  
January, 2017 Dan Jones  
December 2021 Jason Felton

Will this course be taught online? Yes \_\_\_ No X

If yes, please complete the Online Course Outline Form.





# NASHUA COMMUNITY COLLEGE

## COURSE OUTLINE FORM

<b>Course Title: Automotive Suspension and Steering</b>			
<b>Course Prefix &amp; No.: AUTO114N</b>	<b>Lecture Hours: 2</b>	<b>Lab Hours: 4</b>	<b>Credit Hours: 3</b>
<b>Department: Transportation Technology</b>			
<b>Program: Automotive Technology</b>			
<b>Revision Date: 12/2021</b>			

### **Prerequisites/ Co-requisites:**

C or better in AUTO121N

### **Required Accuplacer Score:**

### **Entrance Skills:**

- A minimum of one year of high school Algebra I is recommended.
- Basic skills in written English are required.
- Basic reading skills are required.
- Basic computer skills are required.
- Students are expected to possess a good work ethic and a strong desire to learn.
- A valid motor vehicle driver's license is required

### **Catalog Description:**

An introduction to automotive suspension systems, four-wheel alignment, wheel balancing and Road force the lecture covers topics from basic components, Dynamic suspension systems, performance dampers and alignment angles. The lab includes the diagnostics and repair of steering and suspension components, wheel alignments and wheel and tire service. A grade of C or Better is required for progression

### Course Competencies:

<b>Competency (Knowledge and Skills)</b>	<b>Critical Thinking Level</b>	<b>Linked to Program Outcome(s) #</b>
Students will be able to:		
1. To examine the principles of design and operation of steering and suspension systems	Identify	
2. Exercise safe procedures related to servicing steering and suspension systems	Employ	
3. To maintain, diagnose and repair steering and suspension systems	Analyze	
4. To perform four-wheel alignment	Apply, Employ and modify,	
5. To perform wheel and tire diagnosis and repair	Apply, modify	
6. To test and repair hydraulic power assist steering	Apply, discover, analyze, modify	

### Course Outline:

<b>Content Topic</b>	<b>Subtopics (a., b., etc.)</b>
Introduction and Shop Safety	a. Lift points b. Shop procedures
Suspension Components	a. Bushings b. Ball joints c. Control arms d. Dampers e. struts

Suspension systems service	<ul style="list-style-type: none"> <li>a. inspection</li> <li>b. replacement</li> <li>c. adjustment</li> </ul>
Steering system service	<ul style="list-style-type: none"> <li>a. tie rods</li> <li>b. steering gear</li> <li>c. steering columns</li> <li>d. power assist</li> </ul>
Wheel and tire service	<ul style="list-style-type: none"> <li>a. mount, Road force and balance</li> <li>b. diagnose vibration issues</li> </ul>
Electric Suspension service	<ul style="list-style-type: none"> <li>a. Identify electric suspension components</li> <li>b. Repair</li> <li>c. Precaution</li> </ul>
Four Wheel Alignments	<ul style="list-style-type: none"> <li>a. Set-up of alignment machine</li> <li>b. Interpretation of alignment angles</li> <li>c. Identify adjustment points</li> </ul>

### Performance Evaluation:

<p><b>Formative Assessments</b></p> <ol style="list-style-type: none"> <li>1. Lab participation grade</li> <li>2. Classroom participation</li> <li>3. Quizzes</li> <li>4. Midterm exam</li> <li>5. Homework assignments, reading</li> </ol>	<p><b>Summative Assessments</b></p> <ol style="list-style-type: none"> <li>1. Final exam</li> <li>2. Lab practical exam</li> </ol>
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**Method of Instruction:**

1. Lecture and discussion
2. Required reading
3. Demonstration
4. Laboratory work

**Instructional Facilities:**

For this course a traditional classroom with working audio/visual equipment is required as well as working lab space in the automotive lab. Must have access to wheel service, strut service and wheel alignment machine

**Revision History:**

September, 2006 Tim Hogan  
February, 2008 Tim Hogan  
May, 2012 Tim Hogan  
April, 2013 Tim Hogan  
January 2017 Tim Hogan  
December 2021 Jason Felton

Will this course be taught online? Yes\_\_\_No X\_\_

If yes, please complete the Online Course Outline Form.



# NASHUA COMMUNITY COLLEGE

## COURSE OUTLINE FORM

<b>Course Title: Automotive Service And Maintenance</b>			
<b>Course Prefix &amp; No.: AUTO121N</b>	<b>Lecture Hours: 2</b>	<b>Lab Hours: 4</b>	<b>Credit Hours: 4</b>
<b>Department: Transportation Technology</b>			
<b>Program: Automotive Technology</b>			
<b>Revision Date: 12/2021</b>			

### **Prerequisites/ Co-requisites:**

Admission into the Automotive Technology Program

### **Required Accuplacer Score:**

### **Entrance Skills:**

- A minimum of one year of high school Algebra I is recommended
- Basic skills in written English are required
- Basic reading skills are required
- Basic computer skills are required
- Students are expected to possess a good work ethic and a strong desire to learn.
- A valid motor vehicle driver's license is required

### **Catalog Description:**

The study and development of skills in automotive maintenance and preventive maintenance procedures such as engine lubrication, exhaust systems, cooling systems, tire rotation and balance, and NH state motor vehicle inspection procedures, engine drive belt, thread repair, Oxy/acetylene torches and mig welding fundamentals. A student must earn a 'C' or better to achieve a passing grade in this course. This course contains a service learning opportunity

**Course Competencies:**

<b>Competency (Knowledge and Skills)</b> Students will be able to:	<b>Critical Thinking Level</b>	<b>Linked to Program Outcome(s) #</b>
1. The student will learn the safety procedures involved in the service and repair of automotive chassis systems.	Recognize and apply	
2. The student will learn to safely perform the proper procedures involved in servicing and/or repairing the following automotive systems: engine, lubrication, air intake, exhaust, cooling, automatic transmission, manual transmission, transfer case, and rear differential.	Recognize and apply	
3. The student will learn the proper procedures in using the oxygen acetylene torch to perform cutting, welding, and brazing.	Apply	
4. The student will learn the basic proper procedures involved in MIG welding.	Apply	
5. The student will learn to perform new vehicle destination service and NH State motor vehicle inspection.	Apply and analyze	
6. The student will learn the proper procedures for using the black light for fluid leak detection.	Analyze and apply	

**Course Outline:**

<b>Content Topic</b>	<b>Subtopics ( a., b., etc.)</b>
Introduction	
Safety	<ul style="list-style-type: none"> <li>a. Safety in the workplace</li> <li>b. Hazardous materials and wastes</li> <li>c. MSDS sheets</li> <li>d. Safety equipment</li> <li>e. Hand tools</li> </ul>

Lubrication	<ul style="list-style-type: none"> <li>a. Purposes of lubrication</li> <li>b. Contaminants</li> <li>c. Oil characteristics</li> <li>d. Oil classifications</li> <li>e. Synthetic oils</li> <li>f. Greases</li> <li>g. Oil change intervals</li> </ul>
Automotive lubrication systems	<ul style="list-style-type: none"> <li>a. Lubrication system operation</li> <li>b. Lubrication system parts</li> <li>c. Lubrication system service</li> </ul>
Drive Belts, Fasteners, Gaskets, Seals, Sealants, and Adhesives	<ul style="list-style-type: none"> <li>a. Fasteners and thread repair</li> <li>b. gaskets, seals, sealants and adhesive types and usage</li> <li>c. Automotive belts, types and usage</li> <li>d. Automotive Belts, gaskets, and seal service</li> </ul>
Cooling Systems	<ul style="list-style-type: none"> <li>a. Principles of the cooling system</li> <li>b. Types of cooling systems</li> <li>c. Cooling system parts and operation</li> <li>d. Coolant characteristics</li> <li>e. Cooling system Service</li> </ul>
Air Intake and Exhaust Systems	<ul style="list-style-type: none"> <li>a. Air intake systems</li> <li>b. Exhaust systems</li> <li>c. Intake and exhaust service</li> </ul>
Oxygen Acetylene Torch Usage	<ul style="list-style-type: none"> <li>a. Oxygen acetylene torch safety</li> <li>b. Oxygen acetylene welding and brazing theory and technique</li> <li>c. Oxygen acetylene welding and brazing</li> </ul>
MIG Welding	<ul style="list-style-type: none"> <li>a. MIG welding safety</li> <li>b. MIG welding theory and technique</li> <li>c. MIG welding</li> </ul>

NH Motor Vehicle Inspection, Pre Delivery Inspection	<ul style="list-style-type: none"> <li>a. NHSI principles</li> <li>b. NHSI procedures</li> <li>c. PDI procedures</li> </ul>
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**Performance Evaluation:**

<p><b>Formative Assessments</b></p> <ul style="list-style-type: none"> <li>1. Lab participation grade</li> <li>2. Classroom participation</li> <li>3. Quizzes</li> <li>4. Midterm exam</li> <li>5. Homework assignments, reading</li> </ul>	<p><b>Summative Assessments</b></p> <ul style="list-style-type: none"> <li>1. Final exam</li> <li>2. Lab practical exam</li> </ul>
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<p><b>Method of Instruction:</b></p> <ul style="list-style-type: none"> <li>1. Lecture and discussion</li> <li>2. Required reading</li> <li>3. Demonstration</li> <li>4. Laboratory work</li> </ul>
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<p><b>Instructional Facilities:</b></p> <p>Instructional facilities required for this course include:</p> <ul style="list-style-type: none"> <li>1. A traditional classroom with working audio/visual equipment.</li> <li>2. Lab space including tools and equipment commonly found in an automotive repair facility.</li> </ul>
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<p><b>Revision History:</b></p> <p>September, 2006 Roland Gies  September, 2008 Roland Gies  September, 2012 Roland Gies  March, 2013 Roland Gies  January, 2017 Tim Hogan  December 2021 Jason Felton</p>
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Will this course be taught online? Yes \_\_\_ No \_\_X\_ If yes, please complete the Online Course Outline Form.



**NASHUA COMMUNITY COLLEGE**  
**COURSE OUTLINE FORM**

<b>Course Title: Automotive Brake Systems</b>			
<b>Course Prefix &amp; No.:</b> AUTO122N	<b>Lecture Hours:</b> 2	<b>Lab Hours:</b> 4	<b>Credit Hours:</b> 4
<b>Department: Transportation</b>			
<b>Program: Automotive Technology</b>			
<b>Revision Date: 12/2021</b>			

<b>Prerequisites/ Co-requisite</b> AUTO113N, AUTO121N
<b>Required Accuplacer Score: N/A</b>

<b>Entrance Skills:</b> <ul style="list-style-type: none"><li>· Reading, writing and computational skills as well as computer skills</li><li>· Proper lifting techniques</li><li>· Proper tool identification and usage, proper measuring tool usage</li><li>· Ability to follow repair instructions both written and verbal</li><li>· Ability to use supplied resources for gathering information</li><li>· Proper methods for the disposal of automotive fluids and components</li><li>· A valid motor vehicle driver's license is required</li></ul>
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**Catalog Description**

The study of braking systems with an emphasis on the diagnosis and repair of hydraulic systems of disc and drum brakes, the machining of rotors brake drums, brake line fabrication, ABS and stability control. A grade of C or better is required for progression

Prerequisites: AUTO113N, AUTO121N

**Course Competencies:**

<b>Competency (Knowledge and Skills)</b>	<b>Critical Thinking Level</b>	<b>Linked to Program Outcome(s) #</b>
Students will be able to:		
1. Develop a working knowledge of automotive brake mechanical and hydraulic systems	Identify, analyze and apply	
2. Develop an understanding of brake friction systems	Apply and employ	
3. Develop an understanding of brake measuring and machining equipment	Recognize and apply	
4. Develop an understanding of brake system hydraulics	Recognize and apply	
5. Develop an understanding of brake test equipment	Recognize and apply	
6. Develop safe work habits and respect for shop equipment and personnel	Recognize and apply	

## Course Outline:

Introduction	<ul style="list-style-type: none"><li>a. Tools</li><li>b. Safety</li></ul>
Brake system fundamentals	<ul style="list-style-type: none"><li>a. Brake system overview</li><li>b. Brake legal and health issues</li><li>c. Principals of brake operation</li></ul>
Brake hydraulic system	<ul style="list-style-type: none"><li>a. Brake fluid and lines</li><li>b. Pedal assemblies and master cylinder</li><li>c. Hydraulic valves and switches</li><li>d. Wheel cylinder and caliper hydraulics</li></ul>
Drum and disc brake friction assemblies	<ul style="list-style-type: none"><li>a. Drum brakes</li><li>b. Disc brakes</li><li>c. Brake drums</li><li>d. Brake rotors</li></ul>
Brake subsystems	<ul style="list-style-type: none"><li>a. Parking/emergency brakes</li><li>b. Power brake systems</li><li>c. Anti-lock brake systems</li><li>d. Brake systems and vehicle suspension</li></ul>

## Performance Evaluation:

<b>Formative Assessments</b> <ul style="list-style-type: none"><li>a. Lab participation</li><li>b. Classroom participation</li><li>c. Quizzes</li><li>d. Midterm exam</li><li>e. Homework</li><li>f. Final exam</li></ul>	<b>Summative Assessments</b> <ul style="list-style-type: none"><li>a. Quality of work done in labs</li><li>b. Quantity of work done in labs</li> <li>c. Alternative assignments(essays)</li></ul>
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**Method of Instruction:**

- a. Lecture/ discussion
- b. Required reading/homework
- c. Lab demonstrations/exercises
- d. Live work
- e. Canvas
- f. Powerpoint

**Instructional Facilities:** This course requires a traditional classroom with audio/visual equipment as well as shop/lab facilities with several lifts, brake test equipment, brake machining equipment and work benches

**Revision History:**

4/17/2010 Peter Berger  
4/01/2013 Peter Berger  
1/5/2017 Tim Hogan  
December2021 Jason Felton

Will this course be taught online? Yes\_\_\_No\_X\_\_

If yes, please complete the Online Course Outline



**NASHUA COMMUNITY COLLEGE**  
**COURSE OUTLINE FORM**

<b>Course Title: AUTOMOTIVE ENGINE PERFORMANCE I</b>			
<b>Course Prefix &amp; No.: AUTO185N</b>	<b>Lecture Hours: 2</b>	<b>Lab Hours: 4</b>	<b>Credit Hours: 4</b>
<b>Department: Transportation Technology</b>			
<b>Program: Automotive Technology</b>			
<b>Revision Date: 12/2021</b>			

**Prerequisites/ Co-requisites:**

AUTO113N, AUTO121N

**Required Accuplacer Score:**

**Entrance Skills:**

- Basic skills in written English are required.
- Basic reading skills are required.
- Basic computer skills are required.
- Basic understanding of automotive electricity is required.
- Basic understanding of tools and procedures used to perform automotive repair is required.
- Students are expected to possess a good work ethic and a strong desire to learn
- A valid motor vehicle driver's license is required

**Catalog Description:**

Theory of operation and diagnosis of the intake and exhaust systems, computerized fuel delivery systems and ignition systems are covered. Testing of these systems with OBDII

interfaces and the use various pressure gauges, lab scopes and multi-meter will be covered in lab.

**Course Competencies:**

<b>Competency (Knowledge and Skills)</b>	<b>Critical Thinking Level</b>	<b>Linked to Program Outcome(s) #</b>
Students will be able to:		
1. Safety procedures related compression testing	Describe, apply, employ	
2. A working knowledge of ignition and ignition related systems	Describe, apply, employ	
3. To learn to systematically troubleshoot computer control engines	apply, employ, analyze	
4. To understand and test fuel injection systems	apply, employ, analyze	
5. The ability to use the appropriate test equipment.	apply, employ, analyze	
6. To develop safe working habits and respect for equipment and shop management.	Identify, employ	
7. To perform the above tasks according to ASE Education Foundation standards.	apply	

**Course Outline:**

<b>Content Topic</b>	<b>Subtopics ( a., b., etc.)</b>
INTRODUCTION AND SHOP SAFETY	<ul style="list-style-type: none"> <li>a. Working around moving parts and high voltage</li> </ul>
Gasoline Engine Operation, Parts and Specification	<ul style="list-style-type: none"> <li>a. four stroke cycle</li> <li>b. camshaft/crankshaft relationship</li> <li>c. firing order and ignition interval</li> <li>d. engine-ignition synchronization</li> <li>e. compression testing</li> </ul>
Intake and Exhaust Systems Forced induction	<ul style="list-style-type: none"> <li>a. air box to throttle body</li> <li>b. function of the intake</li> <li>c. function of exhaust and catalytic convertor</li> <li>d. test operation of turbochargers and supercharges</li> <li>e. Vacuum and pressure relationships</li> </ul>
Ignition System Components and Operation	<ul style="list-style-type: none"> <li>a. Ignition system inspection</li> <li>b. Ignition system components</li> <li>c. Use of scan tool to retrieve diag codes</li> </ul>
Ignition System Operation and Service	<ul style="list-style-type: none"> <li>a. Ignition system timing</li> <li>b. Diagnosing a no-start condition</li> <li>c. Use of scan tool to retrieve diag codes</li> </ul>
Fuel Pumps, Lines, Filters	<ul style="list-style-type: none"> <li>a. Fuel delivery testing</li> </ul>
Fuel injection Components and Operation	<ul style="list-style-type: none"> <li>a. Fuel injection component identification and testing</li> </ul>
Fuel injection System Diagnosis and service	<ul style="list-style-type: none"> <li>a. Fuel pressure testing</li> <li>b. Fuel injector testing</li> </ul>



Direct injection Components and Operation Gasoline and Diesel	<ul style="list-style-type: none"> <li>a. Direct injection component identification</li> <li>b. Direct injection component identification</li> </ul>
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**Performance Evaluation: .**

<p><b>Formative Assessments</b></p> <ul style="list-style-type: none"> <li>1. Lab participation grade</li> <li>2. Classroom participation</li> <li>3. Quizzes</li> <li>4. Midterm exam</li> <li>5. Homework assignments, reading</li> </ul>	<p><b>Summative Assessments</b></p> <ul style="list-style-type: none"> <li>1. Final exam</li> <li>2. Lab practical exam</li> </ul>
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<p><b>Method of Instruction:</b></p> <ul style="list-style-type: none"> <li>1. Lecture and discussion</li> <li>2. Demonstrations</li> <li>3. Lab exercises, task sheets</li> <li>4. Power Point presentations</li> </ul>
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<p><b>Instructional Facilities:</b></p> <p>Instructional facilities required for this course include:</p> <ul style="list-style-type: none"> <li>1. A traditional classroom with working audio/visual equipment.</li> <li>2. Lab space including tools and equipment commonly found in an automotive facility dealing with automotive repairs.</li> <li>3. Several lifts.</li> </ul>
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**Revision History:**

October, 2007 Brian Creegan

October, 2011 Brian Creegan

April, 2013 Brian Creegan

January, 2017 Tim Hogan

December 2021 Jason Felton

Will this course be taught online? Yes \_\_\_ No X \_\_\_

If yes, please complete the Online Course Outline Form.



## NASHUA COMMUNITY COLLEGE

### COURSE OUTLINE FORM

<b>Course Title: Automotive Co-Op</b>			
<b>Course Prefix &amp; No. : AUTO190N</b>	<b>Lecture Hours: 0</b>	<b>Lab Hours: 12</b>	<b>Credit Hours: 2</b>
<b>Department: Transportation</b>			
<b>Program: Automotive Technology</b>			
<b>Revision Date: 12/2012</b>			

**Prerequisites/ Co-requisites:** AUTO121, AUTO114, and AUTO122, and a CGPA of 2.0

**Required Accuplacer Score: N/A**

**Entrance Skills:** To be eligible for The Automotive Co-Op the student must have successfully completed AUTO121N, AUTO114 and AUTO122. The student will need to acquire a Co-Op position within one of the Automotive Technology Board members. If a student currently has a job at a shop, that shop may apply to participate in the Co-Op course. The Coordinator will complete and interview with that shop and make a decision as to whether or not that are eligible. In addition to completing the required courses, the student must obtain and maintain a 2.0 CGPA for Co-Op eligibility. Good writing skills will be essential, as students will be required to complete a journal to document their Co-Op experience.

#### **Catalog Description:**

Automotive Technology Co-Op is designed to place students into a shop environment after successful completion of all first-year courses. Students will be assigned work tasks to reinforce the skills learned in their courses at NCC. These tasks will range from oil and filter services to four-wheel alignments, steering component replacement, brake services and check engine diagnosis under the supervision of a senior technician. Students will complete a minimum of 20 hours per week or 200-hours total in the Co-op. Students must bring their tool kit to the Co-Op location. Grades will come from a combination of performance evaluations, input from the onsite supervisor, and co-op coordinator. Students will be responsible for completing a journal that will document their hours worked, assigned workload, and overall shop experience. This course will be designated as a Pass/Fail course. Periodic Co-Op visits will be performed by the assigned instructor to monitor student progress.

**Course Competencies:**

<b>Competency (Knowledge and Skills)</b> Students will be able to:	<b>Critical Thinking Level</b>	<b>Linked to Program Outcome(s) #</b>
1. Successfully execute the roles of an entry level Technician to include task on the provided task list	Employ, Operate, Repeat	
2. Student will work with a mentor and successfully complete assigned work by shop personnel	Operate,	
3. Students will be able to utilize online resource as needed to complete automotive repair assignments successfully	Repeat, Employ	
4. Students will be able to work with other in an automotive shop environment	Relate	

**Course Outline:** See Attached Evaluation Document

<b>Content Topic:</b>  <b>Work Experience Information and Feedback Form</b>	<b>Subtopics ( a., b., etc.)</b>


**Performance Evaluation:**

<b>Formative Assessments</b>	<b>Summative Assessments</b>
1) In Semester Journal Entries Evaluations 2) Shop visits	1) End of semester interview with direct supervisor 2) Documentation of hours worked 3) Journal completion

**Method of Instruction:**

Live working shop experience

**Instructional Facilities:**

Automotive advisory board member shop. Other shops are encouraged to apply for consideration

**Revision History:** Tim Hogan 9/2019, Jason Felton 12/2021

Will this course be taught online? Yes \_\_\_ No X

If yes, please complete the Online Course Outline Form.



# Work Experience Information and Feedback Form

## *Part 1—General information*

Student Name \_\_\_\_\_

Dealership Name \_\_\_\_\_

Service Manager Name \_\_\_\_\_ Phone # \_\_\_\_\_

The student has the following schedule for class attendance:

End of term date: \_\_\_\_\_ Start of term date: \_\_\_\_\_

***Please meet with your student during the first week of work*** to review this form and discuss the expectations that you have for this period. Include any incentives that may be reward for meeting those expectations.

***This form will help you select work assignment*** for your Automotive Technology student and provide you an opportunity to evaluate the student's performance.

***There are four parts to this work experience:***

**General information**—This part explains the form and asks for identification data and general information

**Skill Appraisal**— This part lists the subjects and tasks that the student has covered in the last term. To reinforce the student's learning, we ask that no less than 30 percent to 50 percent of all tasks assigned be related to these areas.

**Performance Appraisal**—This part provides you with an opportunity to evaluate the student's work habits.

**Sign-off Verification**—This part asks for the signature of those involved with the evaluation of the Automotive student's performance, including the student, service manager and any other interested dealership persons.

*Part 2—Skill Appraisal*

**Skill Area**

This tells you what skill area or course work the student has completed this term.

**Tasks**

This tells you what tasks the student is prepared to perform after this term's studies.

**Log**

Complete this at the end of the work experience term. Indicate yes if the student has recorded completing this task.

**Evaluation**

Complete this at the end of the work experience term. Rate the student's performance based upon dealership/industry performance standards. For each task listed, indicate the level of achievement.

1= Student demonstrates understanding but cannot apply the knowledge without supervision

2= Student performs this task satisfactorily with minimal supervision

3= Student performs this task without supervision

Skill Area	<i>Description of Related Tasks</i>	Logged (Y or N)	1 to 3 Scale Evaluations

What other types of tasks did the Automotive Technology student perform satisfactorily? (Use another piece of paper if necessary.)

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### Part 3—Work Habit Traits

#### Evaluation

Complete this at the end of the work term. Rate the student's performance based upon dealership/industry performance standards. For each trait, indicate the level of evaluation.

1= Student performs below expectations

2= Student performs satisfactorily with periodic supervision

3= Student demonstrates outstanding performance

Work Habit or Trait	Description	1 to 3 Scale Evaluations
Job knowledge	Overall knowledge or understanding of all aspects pertinent to the job (Materials equipment, techniques, product knowledge, etc).	
Quality of work	Accuracy, thoroughness, and neatness	
Quantity of work	Number of tasks performed during work period meets expectations	
Dependability	Punctuality and attendance, reliability in carrying out work assignments, amount of supervision required and conscientiousness.	
Behavior	Enthusiasm for job, level of cooperation with associates, supervision, etc. Receptivity to changes and new duties. Resourcefulness and versatility.	
Safety	Uses general shop safety practices	

#### Part 4—Sign Off Verification

**Supervisor (Service Manager or appointed dealership supervisor)**

***The above evaluations are accurate to the best of my knowledge***

Signature \_\_\_\_\_ Date \_\_\_\_\_

Print Name \_\_\_\_\_ Title \_\_\_\_\_

**Student**

Signature \_\_\_\_\_ Date \_\_\_\_\_

**Review by Shop Management/ Principal (optional)**

The above evaluations have been reviewed by me

Signature \_\_\_\_\_ Date \_\_\_\_\_

Print Name \_\_\_\_\_ Title \_\_\_\_\_



