 <b>Nashua Community College</b>	<b>Steering and Suspension AUTO114N Spring 2020</b>
<b>Department</b>	<b>Industry and Transportation</b>
<b>Instructor</b>	Tim Hogan
<b>NCC Email</b>	thogan@ccsnh.edu
<b>Telephone Number</b>	603-578-6885
<b>Office Hours</b>	Tues+Thurs 3:00-3:50 Wed+Fri 2:00-2:50
<b>Office Location</b>	Automotive Building, new office
<b>Class Days/Meeting Time</b>	Tues+Thurs 2:00-2:50, Lab Tues 8-11:50
<b>Class Location</b>	Lecture H286, Lab Auto Bldg, main shop

### Rationale:

The steering and suspension system are what connect the vehicle to the ground. These are safety items, comfort items and performance items. These systems must be inspected and repaired on a required basis to maintain the safety of everyone on the roads. Knowledge of these systems and how it inspect them is required to gain your State Inspectors license.

### Course Description:

An introduction to automotive suspension systems, four-wheel alignment, wheel balancing and Roadforce. 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.

**Due to the safety nature of this course, students must earn a minimum of a C to continue.**

### Course Competencies:

To examine the principles of design and operation of steering and suspension systems

Exercise safe procedures related to servicing steering and suspension systems

To maintain, diagnose and repair steering and suspension systems

To perform four-wheel alignment

To perform wheel and tire diagnosis and repair

To test and repair hydraulic power assist steering

Safety disable the SRS system to be service

## Essential Questions:

What is the function of the steering and suspension system?

What are the possible outcomes if these systems are not serviced properly?

Would you want to be reasonable for these outcomes?

What steps are you going to take to make sure your job is done properly?

## Required Textbook(s):

Automotive Technology Principles, Diagnosis, and Service Fifth edition

James D. Halderman

978-0-12-399461.2

## Supplemental Materials:

Notebook and something to write with

Required Tool kit

## Course Expectations:

We understand that sometimes “life happens” and you cannot get to class on time or at all but, all students are expected to attend each class for the full amount of time scheduled. It is an important part of your education and we want you to be successful.

All lectures and labs begin on the hour.

Tardiness: All students will receive 2 “late entrances” to class. On the third time that student will not be allowed into class and will receive a zero for that class. This will result in an absence and be counted towards the attendance policy for the AF grade.

Absences: Any student that will miss a class should notify the instructor by phone or email prior to the beginning of the class. All absences will result in accrued time towards the AF policy. Students are responsible for any make-up work, missed quizzes and exams due to absence. It is the instructor’s discretion to allow make-up work, take a quiz or exam.

In this section, you must include your late work policy AND your make up policy unless your department has specific requirements posted below. You should also list other expectations that will help students succeed in your course and allow your classroom to function smoothly.

- This class uses mostly live work for the lab. These jobs are booked, on average, 2 weeks out. If you cannot make a lab, it is important you let me know so I can schedule accordingly.
- As a rule, there is no make-up work. If you are not going to make a class be sure, your homework assignment has been completed. Most assignments will be on Canvas. If it is a paper assignment, include it in the email stating you are going to be absent and you will receive full credit. Quizzes can be made up only if there was an email notifying the instructor of the absence. This must be made up prior to the next meeting of the class. It is the student's responsibility to do this.
- Most homework assignments will be end of chapter questions and will be on Canvas. Quizzes will be based on those homework assignments and given in class on paper.
- All powerpoint/class presentations on Canvas for you to review
- Should you have any question or concern you can email me. I normally will return an email within 48 hours.

## Grading:

Include a grade weight breakdown showing the specific components of the student's final grade. For example:

- 10% -- Homework from text book
- 10% -- Quizzes
- 20% -- Daily lab eval/Task sheets, please see the **Daily Lab Evaluation** sheet
- 20% -- Mid-term Exam
- 20% -- Final Exam
- 20% -- Lab Final Exam

Grades will be assigned according to the department scale:

Point/letter grade equivalents:

- 100-94: A
- 93-90: A-
- 89-87: B+
- 86-84: B
- 83-80: B-
- 79-77: C+
- 76-74: C

73-70: C-  
69-67: D+  
66-64: D  
63-60: D-  
Below 60: F

## Available Support Services

**Tutoring, The Writing Center, Available Academic Services:** The Academic Success Center | Room 100 offers academic support services which are open to all NCC students looking for additional help with their college assignments. Math tutoring and writing assistance are available. The Writing Center is for any student seeking assistance with the writing process for any class, not just College Composition. For more information and to view the tutoring schedules view here: <http://www.nashuacc.edu/student-services/academic-success-center>

**Classroom Accommodations:** Students who have a documented disability (physical, learning, or mental health) and require reasonable classroom accommodations must meet with the Disabilities Support Coordinator to set up a NCC Reasonable Accommodation Plan (RAP). If you had an IEP or 504 in high school, you may qualify for a plan. If you would like more information or if you are not sure if you qualify for a plan, please contact Jodi Quinn, Disabilities Support Coordinator, located in The Academic Success Center (Room 100), 603-578-8900 ext. 1451. View additional information and the application here: <http://www.nashuacc.edu/student-services/academic-success-center/disability-services> In order to receive classroom accommodations, it is the student's responsibility to meet with his/her instructor privately and provide a hard copy of the signed Reasonable Accommodation Plan (RAP) each term the student wants to utilize classroom accommodations even if the student has had that instructor in a previous term.

**Audio Record Classroom Lecture:** Please note that as a student in this class, you may have a classmate who by permission can audio record class lectures for his/her learning purposes. **Only students with prior written permission** from the instructor or the Disabilities Support Coordinator may audio record class lectures - *for educational purposes only*. Students who audio record class lectures are prohibited from selling, transcribing, or distributing the recordings in *any manner* and are asked to delete the recordings when it is no longer essential for their learning purposes.

**Title IX Statement:** Classroom instructors at Nashua Community College are encouraged to create and maintain a safe learning environment in which students feel able to share opinions and related life experiences in classroom discussions, in written work, and in meetings with professors. To the greatest extent possible, this information will be kept private. However, staff and faculty have a legal obligation to report information concerning sexual misconduct,

violence and exploitation of individuals per federal statute and in compliance with established policies and procedures at Nashua Community College. If you have been subjected to sexual misconduct, violence or exploitation, we encourage you to contact your NCC Title IX representative Lizbeth Gonzalez, 603-578-8900 x1528\_ or [lgonzalez@ccsnh.edu](mailto:lgonzalez@ccsnh.edu) for support and assistance. You may also contact Bridges, the local crisis center, for free and confidential services at their 24hr support line 603-883-3044. You do not need to be in crisis to call.

Additional information including resources can be found at:

New Hampshire Coalition Against Domestic and Sexual Violence:  
[https://www.nhcadv.org/uploads/1/0/7/5/107511883/nhcadv\\_catchment\\_map.pdf](https://www.nhcadv.org/uploads/1/0/7/5/107511883/nhcadv_catchment_map.pdf)

uSafeUS <https://usafeus.org/app3/webviewer.html>

Bridges <https://www.bridgesnh.org/>

**Additional Student Support Services:** Information on additional support services for NCC students can be found at <http://nashuacc.edu/student-services/where-to-find-assistance-at-ncc>

## Department Policies

Cellphones, laptops, tablets and other electronic equipment should be shut off during class unless previously approved by instructor.

**For example:** laptops/tablets are ok if you have purchase an electric copy of the text book.

### **Required Tools:**

All students are required to possess hand tools per the *Required Tool List*. Each student is expected to have the tools available for each lab session. The instructor reserves the right to refuse admission to (or dismiss from) lab any student who is not regularly prepared with the required tools. All tools should be at the college no later than the first Monday in October.

**Shop Policies:** See Shop Policies posted under the Files tab in Canvas.

## College Policies

**AF Policy:** If a student misses more than the number of hours the course meets during a two-week period (e.g. six hours for a three credit course), the faculty

may withdraw a student from the course with an "AF" grade. Please note that absences, tardies, and leaving class early all count towards "missed class time."

Students should also understand an AF grade can be assigned by an instructor or an administrator at any time for reasons other than poor grade performance or failure to meet attendance requirements e.g., violation of the Student Code of Conduct, disruptive behavior, etc.

Please be advised that if the behavior of any student (or students) continually disrupts the learning of his/her classmates, the following steps will be taken 1) verbal warning; 2) meeting with instructor and department chair; 3) referral to Vice President of Academic Affairs and/or removal from the course with AF grade.

An "AF" grade is calculated in the GPA as an "F". Students should refer to the student handbook for additional information about the AF policy.

**Canvas:** All instructors at NCC will be using Canvas. Canvas is the online learning management system used by instructors and learners at Nashua Community College. Instructors may post syllabi, course related documents and grades in Canvas. Students may be required to submit assignments and/or take assessments through Canvas and/or participate in discussion boards.

To directly link to Canvas On Demand tutorials, please visit the following link:

[https://community.canvaslms.com/community/answers/guides/video-guide#jive\\_content\\_id\\_Students](https://community.canvaslms.com/community/answers/guides/video-guide#jive_content_id_Students)

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**If class is ever cancelled because of instructor illness or inclement weather, students will need to check Canvas for their assignments.**

**College Email System:** Nashua Community College has established a College electronic mail ("email") system as a means of the College sending official information to enrolled students, and for students to send communication to their instructors and College personnel. All students registered at NCC will be assigned a College email account/address to be used as the only email address for all email communication: 1) sent to the students from their instructors and from all College personnel; and, 2) sent by the students to their instructors and to all College personnel.

In addition:

- Students should check their College email account regularly to ensure they are staying current with all official communications. Official

- communication includes, but is not limited to, policy announcements, registration and billing information, schedule changes, emergency notifications and other critical and time sensitive information.
- Students should also check their college email account to be sure that they are current with all email communication from their faculty.
  - The student email account/address should be the only e-mail address students use to send email to faculty and College personnel so that student email is recognized and opened.
  - This service is provided exclusively to the students of NCC. Accounts are for individual use only, and are not transferable or to be used by any other individual.
  - Students using their College email account do so under the policies set forth in the Student Handbook under "Student Computer Conduct Code".

**Sensitive Materials Policy:** During the semester, in order to cover certain academic topics, there may be occasions to view or discuss material which may not meet the student's own personal definition of appropriateness. At such times, every student has the right to decide not to participate. Every effort will be made by the instructor to notify students in advance of when such sensitive material will be used so that students can make alternative arrangements. Faculty will guide students in the identification of alternate learning opportunities consistent with relevant course objectives so that students opting out of scheduled "sensitive" learning experiences will not be penalized academically in any way. Please note the opportunity to leave the classroom discretely is always available to each student when such sensitive material is being discussed. The student then has the responsibility before the next class meeting to inform the instructor as to the reason for leaving.

**Plagiarism Policy:** Plagiarism is a serious violation of a student's academic integrity and the trust between a student and his or her teachers. Plagiarism is the act of a person presenting another person's work as if it were his or her own original work. Such acts of plagiarism include, but are not limited to:

1. A student submitting as his or her own work an entire essay or other assignment written by another person.
2. A student taking word for word a section or sections of another person's work without proper acknowledgment of the source and that the material is quoted.
3. A student using statistics or other such facts or insights as if these were the result of the student's efforts and thus lacking proper acknowledgment of the original source.
4. The paraphrasing of another person's unique work with no acknowledgment of the original source.
5. Copying another student's work on a quiz or test.

When a student is found to have plagiarized an academic assignment, it will be up to each instructor to determine the penalty. Depending on the severity of the

incident, this could range from a warning to a loss of credit for the assignment. In all cases of plagiarism, the student's advisor will be notified and the incident will be documented. If any further incidents of plagiarism are reported to the student's advisor, additional sanctions will be imposed. These may include notification of the Vice President of Academic Affairs; loss of credit for the course; suspension or dismissal from a department program; academic probation; and/or expulsion from the College.

### Credit Hour Guidelines

1. A credit hour shall be the equivalent of one (1) hour of classroom or direct faculty instruction and a minimum of two (2) hours of out-of-class student work each week for 15 or 16 weeks.
2. A credit hour shall be allocated based on the following:

Category	Contact Hours per Week	Contact Hours per Sem. (based on minimum 15 week semester)
Class	1	15
Laboratory	2 or 3	30-45
Clinical	3 to 5	45-75
Practicum, Fieldwork	3	45
Internship	3 to 6	45-90
Co-op	Variable by Dept.	Variable by Dept.


**\*Targeted competencies refer to the established course competencies listed below.**



Week	Month/ Day	Topic	Assignments due	Targeted Competencies*
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1	(Tuesday) Jan 21	Monday, Martin Luther King Jr., no classes Introduction, Dynamics of Handling		Lab safety, Pre-Alignment Inspections
2	Jan 28	Chapter 112 Suspension Components-1		Pre-Alignment inspections and select component replacement
3	Feb 4	Chapter 112 Suspension Components-2 Day 1 Quiz 114-1 Day 2 review quiz	Chapter Quiz 1-10	Pre-Alignment inspections and select component replacement
4	Feb 11	Chapter 119 Four Wheel Alignment Part	Chapter Quiz 1-10	Alignment Demonstration and Component replacement
5	Feb 18	Monday, Presidents' Day, no classes Chapter 120 Four Wheel Alignment Part 2 Quiz 114-2		Component replacement and Alignments
6	Feb 25	Chapter 113 Front Suspension Quiz 114-3	Read Chapter 113 Chapter Quiz 1-10	Front suspension service
7	Mar 3	Chapter 114 Rear Suspension Quiz 114-4	Read Chapter 114 Chapter Quiz 1-10	Rear suspension service
8	Mar 10	Chapter 115 Computer Controlled Suspension Mid-term exam	Read Chapter 115 Chapter Quiz 1-10	Suspension Service and Alignments
	Mar 16-20	<b>Spring Break</b>		
9	Mar 24	Chapter 98 Wheel Bearings	Read Chapter 98 Chapter Quiz 1-10	Wheel bearing Service
10	Mar 31	Chapter 109 Tires and Wheels	Read Chapter 109 Chapter Quiz 1-10	Tire and wheel service
11	Apr 7	Chapter 110 TPMS Quiz 114-5 Tires and TPMS	Read Chapter 110 Chapter Quiz 1-10	TPMS programing
12	April 14	Chapter 116 Steering Columns, Gears and service Chapter 117 Steering linkage	Read Chapter 116	Parallelogram, dry park test
13	April 21	Chapter 118 Power-Assist Quiz 114-6 Steering	Read Chapter 118	Power-Assist Quiz 114-6 Steering
14	April 28	Review for final	Study and review all chapters to date.	State inspection practice
15	May 5	Lab final week no class date TBA		

**This schedule is subject to change. In the event of class cancellation due to inclement weather or instructor illness, students are directed to the course Canvas site for an alternate assignment for that da**

	<b>AUTO122N</b> <b>Automotive Brake Systems</b> <b>Spring 2020</b>
Department	Industry and Transportation
Instructor	Jason Felton
NCC Email	<a href="mailto:jfelton@ccsnh.edu">jfelton@ccsnh.edu</a>
Telephone Number	(603)578-8950
Office Hours	Monday 2:00 – 4:00 Tues and Thurs 2:00 – 3:00
Office Location	Automotive Office
Class Days/Meeting Time	Lecture Tues and Thurs 1:00 – 1:50 Lab Thurs 8:00 – 11:50
Class Location	Lecture: H287 Lab: Auto Building

**Rationale:**

The students in this course will learn how the braking systems in vehicles work and how to properly repair them

**Course Description:**

The study of braking systems with an emphasis on the diagnosis and repair of hydraulic systems, disc and drum brakes, the machining of rotors, brake drums, brake line fabrication, ABS and stability control. Due to the safety nature of this course, students must earn a minimum of a C to continue.

**Course Competencies:**

- Develop a working knowledge of automotive brake mechanical and hydraulic systems
- Develop an understanding of brake friction systems
- Develop an understanding of brake measuring and machining equipment
- Develop an understanding of brake system hydraulics
- Develop an understanding of brake test equipment
- Develop safe work habits and respect for shop equipment and personnel

**Essential Questions:**

What Safety precautions should I practice while performing work of this nature?

What kind of specialty equipment should I be using while performing work of this nature?

What could be the result of not using the proper equipment or safety precautions while performing work of this nature?

**Required Textbook(s):**

Automotive Technology: Principles, Diagnosis and Service; 5th Ed. 2016

ISBN#9780133994612

**Supplemental Materials:**

Notebook, writing utensil and tools

**Course Expectations:****Attendance:**

Class attendance is considered essential to academic success of students. Since there are constant learning opportunities between faculty members and students, and between students and other students within the classroom or lab, it is expected that students will attend each meeting of each course in which they are enrolled. In addition, the lesson disruptions caused by late arrivals and the resulting missed material is likely to negatively impact each student's learning experience. The instructor reserves the right to refuse admission to any student who repeatedly arrives late for class or lab. Attendance information is typically collected at the beginning of each class/lab meeting, consequently there is no distinction between *absent* and *late*. Furthermore, students may expect random, weekly participation quizzes on covered material and assigned reading. Participation quizzes are generally given at the beginning of class. Only those students who are present, and on time, may participate. Participation quizzes are not eligible for make-up.

If a student is absent more than the number of hours a course meets in a two week period, (10 hours) the faculty may withdraw that student from the course with an "AF" grade any time during the semester. An "AF" grade is calculated in the GPA as an "F". There is no provision in the course calendar for repeating of lectures, labs or demonstrations due to absenteeism.

### **Make Up Policy:**

Not all missed work is eligible for make-up. It is the student's responsibility to inquire about missed work at the first class meeting after returning from an absence. The instructor will determine eligibility and provide an appropriate assignment. Any approved assignment must be completed and turned in as directed. There is no provision for make-up of a midterm exam, final exam, or lab practical exam.

### **Homework:**

Self-study assignments are required. Some are listed in the course calendar, some will be assigned throughout the semester. Chapter end questions assigned per the course calendar are due at the beginning of the first class meeting of the week assigned. Chapter-end questions should include the question number, answer letter as well as the related answer text. Please include the chapter number on your answer sheet.

Scheduled homework assignments are combined into the equivalent of two test grades. Assignments passed in one class late will be accepted at reduced credit. Assignments will not be accepted more than one class late.

Any assignment turned in via e-mail will be accepted provided it is mailed prior to the due date/time.

### **Grading:**

Point/letter grade equivalents:

100-94: A	76-74: C
93-90: A-	73-70: C-
89-87: B+	69-67: D+
86-84: B	66-64: D
83-80: B-	63-60: D-
79-77: C+	Below 60: F

Grading Weights:

10%	Quizzes
5%	Homework
10%	Midterm exam
20%	Final exam
20%	Lab exam
35%	Lab evaluation

### **Available Support Services**

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Additional information including resources can be found at: New Hampshire Coalition Against Domestic and Sexual Violence:  
[http://www.nhcadv.org/Catchment%20map\(1\).pdf](http://www.nhcadv.org/Catchment%20map(1).pdf)

### Department Policies

Cellphones, laptops, tablets and other electronic equipment should be shut off during class unless previously approved by instructor.

### **Required Tools:**

All students are required to possess hand tools per the *Required Tool List*. Each student is expected to have the tools available for each lab session. The instructor reserves the right to refuse admission to (or dismiss from) lab any student who is not regularly prepared with the required tools. All tools should be at the college no later than the first Monday in October.

### **Students Who Wish to Provide “Live” Shop Work**

Any student who wishes to service an outside vehicle (whether owned by the student or not) during a lab must obtain **prior** permission from the instructor. Any charges incurred are due and payable immediately. Current students may be granted a “one school day” grace period, however any student with an excessively delinquent auto bill may be barred from taking a midterm, final, or lab exam. Instructors reserve the right to secure pre-payment for any invoice expected to exceed \$100.

Students are expected to attend all their regularly scheduled classes, laboratory periods, and other academic exercises. Should an absence from regularly scheduled academic exercise be unavoidable (beyond a student's control), it will be the student's responsibility to communicate with the professor, preferably beforehand, concerning the absence. Documentation of said absence may be required by the professor.

Students are advised that absence from class, for whatever reason, does not excuse them from meeting course requirements and objectives.

**If a student is absent more than six hours (for a four-credit course, the total is eight hours) of class time during the term or semester, the instructor may withdraw the student from class using an AF grade, which means an F will be averaged into the GPA.**

In addition to absences from class, tardiness and leaving class early also calculate into missed class time. To avoid this AF, if a student cannot continue to attend class for any reason, he/she should obtain a withdrawal slip from the registrar and follow the process to officially withdraw. Students should also understand an AF grade can be assigned by an instructor or an administrator at any time for reasons other than poor grade performance or failure to meet attendance requirements e.g., violation of the Student Code of Conduct, disruptive behavior, etc. Students should refer to the student handbook for additional information about the AF policy.

It is the responsibility of the student to make up any missed class work, homework assignment, quizzes, or tests in accordance with the instructor's make-up policy.

Depending on the instructor's policy, late papers may or may not be accepted for full credit. See this syllabus for policy details.

All assignments must be typewritten, unless otherwise instructed by the teacher. Any work that is not typewritten will not be accepted.

Specific policy details for the above are outlined in this syllabus.

Revised: 12/18/17

### College Policies

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Please be advised that if the behavior of any student (or students) continually disrupts the learning of his/her classmates, the following steps will be taken 1) verbal warning; 2) meeting with instructor and department chair; 3) referral to Vice President of Academic Affairs and/or removal from the course with AF grade.

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24/7 Canvas Support: To access support through email, phone or chat



click on the  icon. Students can also find guides, videos, and a Canvas community by clicking on the *CCSNH Resources* icon on the tool bar at the left of the Canvas screen then choosing Canvas Resources.

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- Students should check their College email account regularly to ensure they are staying current with all official communications. Official communication includes, but is not limited to, policy announcements, registration and billing information, schedule changes, emergency notifications and other critical and time sensitive information.
- Students should also check their college email account to be sure that they are current with all email communication from their faculty.
- The student email account/address should be the only e-mail address students use to send email to faculty and College personnel so that student email is recognized and opened.
- This service is provided exclusively to the students of NCC. Accounts are for individual use only, and are not transferable or to be used by any other individual.

- Students using their College email account do so under the policies set forth in the Student Handbook under "Student Computer Conduct Code".

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1. A student submitting as his or her own work an entire essay or other assignment written by another person.
2. A student taking word for word a section or sections of another person's work without proper acknowledgment of the source and that the material is quoted.
3. A student using statistics or other such facts or insights as if these were the result of the student's efforts and thus lacking proper acknowledgment of the original source.
4. The paraphrasing of another person's unique work with no acknowledgment of the original source.
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student's program coordinator, additional sanctions will be imposed. These may include notification of the Vice President of Academic Affairs; loss of credit for the course; suspension or dismissal from a department program; academic probation; and/or expulsion from the College.

**Credit Hour Guidelines**


1. A credit hour shall be the equivalent of one (1) hour of classroom or direct faculty instruction and a minimum of two (2) hours of out-of-class student work each week for 15 or 16 weeks.
2. A credit hour shall be allocated based on the following:

Category	Contact Hours per Week	Contact Hours per Sem. (based on minimum 15 week semester)
Class	1	15
Laboratory	2 or 3	30-45
Clinical	3 to 5	45-75
Practicum, Fieldwork	3	45
Internship	3 to 6	45-90
Co-op	Variable by Dept.	Variable by Dept.

## Course Calendar

Week of	LECTURE/DISCUSSION	LAB	ASSIGNMENT
Jan 20 MLK day	<b>Chapters 92 + 93</b> Braking System Law and Principles	Brake Component Identification	Ch. 92 +93 Quiz Questions
Jan 27	<b>Chapter 94</b> Brake Hydraulic Systems	Hydraulic System Component I.D. and Troubleshooting	Ch. 94 Quiz Questions
Feb 3	<b>Chapter 95</b> Hydraulic Valves and Switches	Hydraulic Valve and switch I.D.	Ch. 95 Quiz Questions
Feb 10	<b>Chapters 96 + 97</b> Brake Fluid, Lines and Bleeding	Brake line flaring, bending and bleeding	Ch. 96 + 97 Quiz Questions
Feb 17	<b>Chapter 99</b> Drum Brakes	Drum Brake Component I.D. and operation	Ch. 99 Quiz Questions
Feb 24 Presidents day	<b>Chapter 100</b> Drum Brake Diagnosis and Service	Drum Brake Disassembly and Reassembly	Ch. 100 Quiz Questions
Mar 2	<b>Chapter 101</b> Disc Brakes	Disc Brake Component I.D. and Operation	Ch. 101 Quiz Questions
Mar 9	<b>Chapter 102</b> Disc Brake Diagnosis and Service	Disc Brake Disassembly and Reassembly	Ch. 102 Quiz Questions
Mar 16	Spring Break – No Classes		
Mar 23	<b>Chapter 103</b> Parking Brakes	Parking brake I.D. and adjustment	Ch. 103 Quiz Questions
Mar 30	<b>Chapter 104</b> Machining Drums and Rotors	Brake Disc and Drum Measurement and Machining	Ch. 104 Quiz Questions
Apr 6	<b>Chapter 105</b> Power Brakes	Brake booster I.D., Testing, inspection and replacement	Ch. 105 Quiz Questions
Apr 13	<b>Chapter 106</b> ABS Components and Operation	ABS Component I.D. and function	Ch. 106 Quiz Questions
Apr 20	<b>Chapter 107</b> ABS Diagnosis and Service	ABS Troubleshooting with electrical testers	Ch. 107 Quiz Questions
Apr 27	<b>Chapter 108</b> Electronic Stability Control	ESC Troubleshooting	Ch. 108 Quiz Questions
May 4	Lab Final		

**This schedule is subject to change. In the event of class cancellation due to inclement weather or instructor illness, students are directed to the course Canvas site for an alternate assignment for that day.**

 Nashua Community College	<b>Engine Performance I</b> <b>AUTO185</b> Spring 2020
<b>Department</b>	Transportation Technology
<b>Instructor</b>	Ben Wagstaff
<b>NCC Email</b>	bwagstaff@ccsnh.edu
<b>Telephone Number</b>	603-882-6923 X-1543
<b>Office Hours</b>	Tue + Thu 9:00am-10:00am, Wed 9:00am-12:00pm, Fri 1:00pm- 2:00pm
<b>Office Location</b>	Automotive Building
<b>Class Days/Meeting Time</b>	Lecture: Tue 3:00-3:50 pm, Thu 3:00-3:50pm Lab AL1: Fri 8:00am-10:50am
<b>Class Location</b>	Lecture: Room. H287; Lab: Auto Bldg. Room 8

### Rationale:

Develop safe work habits and respect for shop equipment and personnel.

### Course 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 use various pressure gauges, lab scopes and multi-meter will be cover in lab.

### Course Competencies:

<b>Competency (Knowledge and Skills)</b>	<b>Critical Thinking Level</b>
Students will be able to:	
Safety procedures related compression testing	Describe, apply, employ
A working knowledge of ignition and ignition related systems	Describe, apply, employ
To learn to systematically troubleshoot computer control engines	apply, employ, analyze
To understand and test fuel injection systems	apply, employ, analyze
The ability to use the appropriate test equipment.	apply, employ, analyze
To develop safe working habits and respect for equipment and shop management.	Identify, employ

### Essential Questions:

What Safety precautions should I practice while performing work of this nature?

What kind of specialty equipment should I be using while performing work of this nature?

What could be the result of not using the proper equipment or safety precautions while performing work of this nature?

### **Required Textbook(s):**

Automotive Technology: Principles, Diagnosis and Service; 5th Ed. 2016

ISBN#9780133994612

### **Supplemental Materials:**

Access to Electude.

### **Course Expectations:**

#### **Attendance:**

Class attendance is considered essential to academic success of students. Since there are constant learning opportunities between faculty members and students, and between students and other students within the classroom or lab, it is expected that students will attend each meeting of each course in which they are enrolled. In addition, the lesson disruptions caused by late arrivals and the resulting missed material is likely to negatively impact each student's learning experience. The instructor reserves the right to refuse admission to any student who repeatedly arrives late for class or lab. Attendance information is typically collected at the beginning of each class/lab meeting, consequently there is no distinction between *absent* and *late*. Furthermore, students may expect random, weekly participation quizzes on covered material and assigned reading. Participation quizzes are generally given at the beginning of class. Only those students who are present, and on time, may participate. Participation quizzes are not eligible for make-up.

If a student is absent more than the number of hours a course meets in a two week period, (10 hours) the faculty may withdraw that student from the course with an "AF" grade any time during the semester. An "AF" grade is calculated in the GPA as an "F". There is no provision in the course calendar for repeating of lectures, labs or demonstrations due to absenteeism.

#### **Make Up Policy:**

Not all missed work is eligible for make-up. It is the student's responsibility to inquire about missed work at the first class meeting after returning from an

absence. The instructor will determine eligibility and provide an appropriate assignment. Any approved assignment must be completed and turned in as directed. There is no provision for make-up of a midterm exam, final exam, or lab practical exam.

### **Homework:**

Self-study assignments are required. Some are listed in the course calendar, some will be assigned throughout the semester. Chapter end questions assigned per the course calendar are due at the beginning of the first class meeting of the week assigned. Chapter-end questions should include the question number, answer letter as well as the related answer text. Please include the chapter number on your answer sheet.

Scheduled homework assignments are combined into the equivalent of two test grades. Assignments passed in one class late will be accepted at reduced credit. Assignments will not be accepted more than one class late.

Any assignment turned in via e-mail will be accepted provided it is mailed prior to the due date/time.

### **Grading:**

Point/letter grade equivalents:

100-94: A	76-74: C
93-90: A-	73-70: C-
89-87: B+	69-67: D+
86-84: B	66-64: D
83-80: B-	63-60: D-
79-77: C+	Below 60: F

Grading Weights:

20%	Quizzes
20%	Homework
20%	Midterm exam
20%	Final exam
10%	Lab exam
10%	Lab evaluation

## **Available Support Services**

**Tutoring ,The Writing Center, Available Academic Services:** The Academic Success Center | Room 100 offers academic support services which are open to all NCC students looking for additional help with their college assignments. Math tutoring and Writing assistance are available. The Writing Center is for any student seeking assistance with the writing process for any class, not just College Composition. For more information and to view the tutoring schedules view here: <http://www.nashuacc.edu/student-services/academic-success-center>

**Classroom Accommodations:** Students who have a documented disability (physical, learning, or mental health) and require reasonable classroom

accommodations must meet with the Disabilities Support Coordinator to set up a NCC Reasonable Accommodation Plan (RAP). If you had an IEP or 504 in high school, you may qualify for a plan. If you would like more information or if you are not sure if you qualify for a plan, please contact Jodi Quinn, Disabilities Support Coordinator, located in The Academic Success Center (Room 100), 603-578-8900 ext. 1451. View additional information and the application here:

<http://www.nashuacc.edu/student-services/academic-success-center/disability-services>. In order to receive classroom accommodations, it is the student's responsibility to meet with his/her instructor privately and provide a hard copy of the signed Reasonable Accommodation Plan (RAP) each term the student wants to utilize classroom accommodations even if the student has had that instructor in a previous term.

**Audio Record Classroom Lecture:** Please note that as a student in this class, you may have a classmate who by permission can audio record class lectures for his/her learning purposes. **Only students with prior written permission** from the instructor or the Disabilities Support Coordinator may audio record class lectures - *for educational purposes only*. Students who audio record class lectures are prohibited from selling, transcribing, or distributing the recordings in *any manner* and are asked to delete the recordings when it is no longer essential for their learning purposes.

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Additional information including resources can be found at:

New Hampshire Coalition Against Domestic and Sexual Violence:

[https://www.nhcadv.org/uploads/1/0/7/5/107511883/nhcadv\\_catchment\\_map.pdf](https://www.nhcadv.org/uploads/1/0/7/5/107511883/nhcadv_catchment_map.pdf)

uSafeUS <https://usafeus.org/app3/webviewer.html>

Bridges <https://www.bridgesnh.org/>



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## Department Policies

Cellphones, laptops, tablets and other electronic equipment should be shut off during class unless previously approved by instructor.

### **Required Tools:**

All students are required to possess hand tools per the *Required Tool List*. Each student is expected to have the tools available for each lab session. The instructor reserves the right to refuse admission to (or dismiss from) lab any student who is not regularly prepared with the required tools. All tools should be at the college no later than the first Monday in October.

### **Students Who Wish to Provide "Live" Shop Work**

Any student who wishes to service an outside vehicle (whether owned by the student or not) during a lab must obtain **prior** permission from the instructor. Any charges incurred are due and payable immediately. Current students may be granted a "one school day" grace period, however any student with an excessively delinquent auto bill may be barred from taking a midterm, final, or lab exam. Instructors reserve the right to secure pre-payment for any invoice expected to exceed \$100.

## College Policies

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Students should also understand an AF grade can be assigned by an instructor or an administrator at any time for reasons other than poor grade performance or failure to meet attendance requirements e.g., violation of the Student Code of Conduct, disruptive behavior, etc.

Please be advised that if the behavior of any student (or students) continually disrupts the learning of his/her classmates, the following steps will be taken 1) verbal warning; 2) meeting with instructor and department chair; 3) referral to Vice President of Academic Affairs and/or removal from the course with AF grade.

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[https://community.canvaslms.com/community/answers/guides/video-guide#jive\\_content\\_id\\_Students](https://community.canvaslms.com/community/answers/guides/video-guide#jive_content_id_Students)

If you have forgotten your Easy Login Password information, please visit the following link: <https://password.ccsnh.edu/accounts/Reset>

**If class is ever cancelled because of instructor illness or inclement weather, students will need to check Canvas for their assignments.**

**College Email System:** Nashua Community College has established a College electronic mail ("email") system as a means of the College sending official information to enrolled students, and for students to send communication to their instructors and College personnel. All students registered at NCC will be assigned a College email account/address to be used as the only email address for all email communication: 1) sent to the students from their instructors and from all College personnel; and, 2) sent by the students to their instructors and to all College personnel.

In addition:

- Students should check their College email account regularly to ensure they are staying current with all official communications. Official communication includes, but is not limited to, policy announcements, registration and billing information, schedule changes, emergency notifications and other critical and time sensitive information.
- Students should also check their college email account to be sure that they are current with all email communication from their faculty.
- The student email account/address should be the only e-mail address students use to send email to faculty and College personnel so that student email is recognized and opened.
- This service is provided exclusively to the students of NCC. Accounts are for individual use only, and are not transferable or to be used by any other individual.
- Students using their College email account do so under the policies set forth in the Student Handbook under "Student Computer Conduct Code".

**Sensitive Materials Policy:** During the semester, in order to cover certain academic topics, there may be occasions to view or discuss material which may not meet the student's own personal definition of appropriateness. At such times, every student has the right to decide not to participate. Every effort will be made by the instructor to notify students in advance of when such sensitive material will be used so that students can make alternative arrangements. Faculty will guide students in the identification of alternate learning opportunities consistent with relevant course objectives so that students opting out of scheduled "sensitive" learning experiences will not be penalized academically in any way. Please note the opportunity to leave the classroom discretely is always available to each student when such sensitive material is being discussed. The student then has the responsibility before the next class meeting to inform the instructor as to the reason for leaving.

**Plagiarism Policy:** Plagiarism is a serious violation of a student's academic integrity and the trust between a student and his or her teachers. Plagiarism is the act of a person presenting another person's work as if it were his or her own original work. Such acts of plagiarism include, but are not limited to:

1. A student submitting as his or her own work an entire essay or other assignment written by another person.
2. A student taking word for word a section or sections of another person's work without proper acknowledgment of the source and that the material is quoted.
3. A student using statistics or other such facts or insights as if these were the result of the student's efforts and thus lacking proper acknowledgment of the original source.
4. The paraphrasing of another person's unique work with no acknowledgment of the original source.
5. Copying another student's work on a quiz or test.

When a student is found to have plagiarized an academic assignment, it will be up to each instructor to determine the penalty. Depending on the severity of the incident, this could range from a warning to a loss of credit for the assignment. In all cases of plagiarism, the student's program coordinator will automatically be notified and the incident will be documented. If any further incidents of plagiarism are reported to the student's program coordinator, additional sanctions will be imposed. These may include notification of the Vice President of Academic Affairs; loss of credit for the course; suspension or dismissal from a department program; academic probation; and/or expulsion from the College.


### Credit Hour Guidelines

1. A credit hour shall be the equivalent of one (1) hour of classroom or direct faculty instruction and a minimum of two (2) hours of out-of-class student work each week for 15 or 16 weeks.
2. A credit hour shall be allocated based on the following:

Category	Contact Hours per Week	Contact Hours per Sem. (based on minimum 15 week semester)
Class	1	15
Laboratory	2 or 3	30-45
Clinical	3 to 5	45-75
Practicum, Fieldwork	3	45
Internship	3 to 6	45-90
Co-op	Variable by Dept.	Variable by Dept.

### AUTO185 Course Calendar (Tentative) Spring 2020

Week #	Week of	LECTURE/DISCUSSION	LAB	ASSIGNMENT
1	Jan 20 <small>MLK day</small>	<b>Chapter 18</b> Gasoline Engine Operation, Parts and Specification	Shop Safety Engine fundamentals Compression Testing	<u>Due THU</u> - Ch. 18 quiz questions
2	Jan 27	<b>Chapter 19</b> Diesel Engine Operation	Diesel engine design, operation and troubleshooting	<u>Due TUE</u> - <u>Due THU</u> - Ch. 19 quiz questions
3	Feb 3	<b>Chapter 24</b> Intake and Exhaust Systems	Vacuum Testing The paper test	<u>Due TUE</u> - <u>Due THU</u> - Ch. 24 quiz questions
4	Feb 10	<b>Chapter 25</b> Turbocharging and Supercharging	Ignition system inspection Ignition system components	<u>Due TUE</u> - <u>Due THU</u> - Ch.25 quiz questions
5	Feb 17 <small>Presidents day</small>	<b>Chapter 69</b> Ignition System Components and Operation	Ignition Timing Diagnosing a No-Start Condition	<u>Due TUE</u> - <u>Due THU</u> - Ch. 69 quiz questions
6	Feb 24	<b>Chapter 70</b> Ignition System Operation and Service Mid-term Review	Using a lab scope to diagnose ignition faults	<u>Due TUE</u> - <u>Due THU</u> - Ch.70 quiz questions
7	Mar 2	<b>Chapter 66</b> Gasoline	Gasoline inspection Octane Irregular combustion	<u>Due TUE</u> - <u>Due THU</u> - Ch.66 quiz questions
8	Mar 9	<b>Chapter 67</b> Alternative Fuels <b>Mid -Term</b>	Fuel system service Ethanol testing	<u>Due TUE</u> - <u>Due THU</u> - Ch.67 quiz questions
9	Mar 16	Spring Break – No Classes		
10	Mar 23	<b>Chapter 77</b> Fuel Pumps, Lines and Filters	Fuel Injection Component Identification and Testing	<u>Due TUE</u> - <u>Due THU</u> - Ch.77 quiz questions
11	Mar 29	<b>Chapter 78</b> Fuel Injection Components and Operation	Fuel Pressure testing Fuel Injector Testing	<u>Due TUE</u> - <u>Due THU</u> - Ch.78 quiz questions
12	Apr 6	<b>Chapter 81</b> Fuel Injection System Diagnosis and Service	Fuel System cleaning Fuel System Diagnosis	<u>Due TUE</u> <u>Due THU</u> - Ch.81 quiz questions
13	Apr 13	<b>Chapter 79</b> Gasoline Direct Injection Systems	Gasoline Direct Injection System Safety, Inspection and Diagnosis	<u>Due TUE</u> - <u>Due THU</u> - Ch.79 quiz questions
14	Apr 20	<b>Chapter 43</b> Oscilloscopes and Graphing Multimeters	Setting up an oscilloscope	<u>Due TUE</u> - <u>Due THU</u> - Ch. 43 quiz questions
15	Apr 27	Final exam	Lab Review	
16	May 4	Review		Lab Final

 Nashua Community College	<b>ENGINE PERFORMANCE II</b> <b>AUTO215</b> Spring 2019
<b>Department</b>	Transportation Technology
<b>Instructor</b>	Ben Wagstaff
<b>NCC Email</b>	bwagstaff@ccsnh.edu
<b>Telephone Number</b>	603-882-6923 X-1543
<b>Office Hours</b>	Tue + Thu 9:00am-10:00am, Wed 9:00am-12:00pm, Fri 1:00pm- 2:00pm
<b>Office Location</b>	Automotive Building
<b>Class Days/Meeting Time</b>	Lecture: Tue 2:00-2:50 pm, Thu 2:00-2:50pm Lab AL1: Mon 1:00pm-3:50pm
<b>Class Location</b>	Lecture: Room. H287; Lab: Auto Bldg. Room 8

### Rationale:

Develop safe work habits and respect for shop equipment and personnel.

### Course Description:

A continuation of Engine Performance I with a focus on advanced diagnostics of engine control systems using, OBD-II interface and lab scopes. The function and operation of the supporting emission systems to include exhaust Catalyst, EVAP and EGR systems will be covered.

### Course Competencies:

<b>Competency (Knowledge and Skills)</b>	<b>Critical Thinking Level</b>
Students will be able to:	
A working knowledge of basic fuel and electronic fuel injection systems including related computer control systems.	Recognize
The ability to troubleshoot and repair engine performance concerns.	Apply and analyze
A working knowledge of automotive emission control systems.	Recognize, apply and analyze
The ability to troubleshoot and repair automotive emission control systems.	Recognize and analyze
The ability to determine the relationship between ignition system failures and fuel system failures and how exhaust emissions levels are influenced by each.	Identify and analyze
The ability to use the appropriate electronic test equipment.	Recognize and apply

## Essential Questions:

What Safety precautions should I practice while performing work of this nature?

What kind of specialty equipment should I be using while performing work of this nature?

What could be the result of not using the proper equipment or safety precautions while performing work of this nature?

## Required Textbook(s):

Automotive Technology: Principles, Diagnosis and Service; 5th Ed. 2016

ISBN#9780133994612

## Supplemental Materials:

Access to Electude.

## Course Expectations:

### Attendance:

Class attendance is considered essential to academic success of students. Since there are constant learning opportunities between faculty members and students, and between students and other students within the classroom or lab, it is expected that students will attend each meeting of each course in which they are enrolled. In addition, the lesson disruptions caused by late arrivals and the resulting missed material is likely to negatively impact each student's learning experience. The instructor reserves the right to refuse admission to any student who repeatedly arrives late for class or lab. Attendance information is typically collected at the beginning of each class/lab meeting, consequently there is no distinction between *absent* and *late*. Furthermore, students may expect random, weekly participation quizzes on covered material and assigned reading. Participation quizzes are generally given at the beginning of class. Only those students who are present, and on time, may participate. Participation quizzes are not eligible for make-up.

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course calendar for repeating of lectures, labs or demonstrations due to absenteeism.

### **Make Up Policy:**

Not all missed work is eligible for make-up. It is the student's responsibility to inquire about missed work at the first class meeting after returning from an absence. The instructor will determine eligibility and provide an appropriate assignment. Any approved assignment must be completed and turned in as directed. There is no provision for make-up of a midterm exam, final exam, or lab practical exam.

### **Homework:**

Self-study assignments are required. Some are listed in the course calendar, some will be assigned throughout the semester. Chapter end questions assigned per the course calendar are due at the beginning of the first class meeting of the week assigned. Chapter-end questions should include the question number, answer letter as well as the related answer text. Please include the chapter number on your answer sheet.

Scheduled homework assignments are combined into the equivalent of two test grades. Assignments passed in one class late will be accepted at reduced credit. Assignments will not be accepted more than one class late.

Any assignment turned in via e-mail will be accepted provided it is mailed prior to the due date/time.

### **Grading:**

Point/letter grade equivalents:

100-94: A	76-74: C
93-90: A-	73-70: C-
89-87: B+	69-67: D+
86-84: B	66-64: D
83-80: B-	63-60: D-
79-77: C+	Below 60: F

Grading Weights:

20%	Quizzes
20%	Homework
20%	Midterm exam
20%	Final exam
10%	Lab exam
10%	Lab evaluation

## **Available Support Services**

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[https://community.canvaslms.com/community/answers/guides/video-guide#jive\\_content\\_id\\_Students](https://community.canvaslms.com/community/answers/guides/video-guide#jive_content_id_Students)

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**If class is ever cancelled because of instructor illness or inclement weather, students will need to check Canvas for their assignments.**

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In addition:

- Students should check their College email account regularly to ensure they are staying current with all official communications. Official communication includes, but is not limited to, policy announcements, registration and billing information, schedule changes, emergency notifications and other critical and time sensitive information.
- Students should also check their college email account to be sure that they are current with all email communication from their faculty.
- The student email account/address should be the only e-mail address students use to send email to faculty and College personnel so that student email is recognized and opened.
- This service is provided exclusively to the students of NCC. Accounts are for individual use only, and are not transferable or to be used by any other individual.

- Students using their College email account do so under the policies set forth in the Student Handbook under "Student Computer Conduct Code".

**Sensitive Materials Policy:** During the semester, in order to cover certain academic topics, there may be occasions to view or discuss material which may not meet the student's own personal definition of appropriateness. At such times, every student has the right to decide not to participate. Every effort will be made by the instructor to notify students in advance of when such sensitive material will be used so that students can make alternative arrangements. Faculty will guide students in the identification of alternate learning opportunities consistent with relevant course objectives so that students opting out of scheduled "sensitive" learning experiences will not be penalized academically in any way. Please note the opportunity to leave the classroom discretely is always available to each student when such sensitive material is being discussed. The student then has the responsibility before the next class meeting to inform the instructor as to the reason for leaving.

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1. A student submitting as his or her own work an entire essay or other assignment written by another person.
2. A student taking word for word a section or sections of another person's work without proper acknowledgment of the source and that the material is quoted.
3. A student using statistics or other such facts or insights as if these were the result of the student's efforts and thus lacking proper acknowledgment of the original source.
4. The paraphrasing of another person's unique work with no acknowledgment of the original source.
5. Copying another student's work on a quiz or test.

When a student is found to have plagiarized an academic assignment, it will be up to each instructor to determine the penalty. Depending on the severity of the incident, this could range from a warning to a loss of credit for the assignment. In all cases of plagiarism, the student's program coordinator will automatically be notified and the incident will be documented. If any further incidents of plagiarism are reported to the student's program coordinator, additional sanctions will be imposed. These may include notification of the Vice President of Academic Affairs; loss of credit for the course; suspension or dismissal from a department program; academic probation; and/or expulsion from the College.

### Credit Hour Guidelines

1. A credit hour shall be the equivalent of one (1) hour of classroom or direct faculty instruction and a minimum of two (2) hours of out-of-class student work each week for 15 or 16 weeks.
2. A credit hour shall be allocated based on the following:

Category	Contact Hours per Week	Contact Hours per Sem. (based on minimum 15 week semester)
Class	1	15
Laboratory	2 or 3	30-45
Clinical	3 to 5	45-75
Practicum, Fieldwork	3	45
Internship	3 to 6	45-90
Co-op	Variable by Dept.	Variable by Dept.

**AUTO215**  
**Course Calendar (Tentative) Spring 2019**

Week #	Week of	LECTURE/DISCUSSION	LAB	ASSIGNMENT
1	Jan 20 MLK day	<b>Chapter 71</b> Computer Fundamentals	Testing two-wire computer inputs	<b><u>Due Thu</u></b> – Ch. 71 Quiz Questions
2	Jan 27	<b>Chapter 72</b> Temperature Sensors	Testing Three-wire computer inputs	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 72 Quiz Questions
3	Feb 3	<b>Chapter 73</b> Throttle Position Sensors	Throttle Position Sensor Testing and Load Calculation	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 73 Quiz Questions
4	Feb 10	<b>Chapter 74</b> MAP Sensors	MAP Sensor, Load Calculation and Injector PWM	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 74 Quiz Questions
5	Feb 17 Presidents day	<b>Chapter 75</b> Mass Airflow Sensors	Mass Airflow Sensor, Load Calculation and Injector PWM	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 75 Quiz Questions
6	Feb 24	<b>Chapter 76</b> Oxygen Sensors	Open Loop, Closed Loop, and Fuel Trim	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 76 Quiz Questions
7	Mar 2	<b>Chapter 80</b> Electronic Throttle Control	ETC Inspection, testing and Cleaning	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 80 Quiz Questions
8	Mar 9	<b>Chapter 82</b> Emissions Standards and Testing	Five-Gas Exhaust Analysis	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 82 Quiz Questions
9	Mar 16	Spring Break – No Classes		
10	Mar 23	<b>Chapter 87</b> On Board Diagnosis	Pre and Post OBD2 Troubleshooting	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 87 Quiz Questions
11	Mar 29	<b>Chapter 88</b> Scan Tools and Engine Performance Diagnosis	OBD Diagnosis using Scan Tools	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 88 Quiz Questions
12	Apr 6	<b>Chapter 83</b> Evaporative Emissions Systems	EVAP and Enhanced EVAP System operation and testing	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 83 Quiz Questions
13	Apr 13	<b>Chapter 84</b> Exhaust Gas Recirculation	EGR System Operation and Testing	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 84 Quiz Questions
14	Apr 20	<b>Chapter 85</b> Positive Crankcase Ventilation	PCV troubleshooting	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 85 Quiz Questions
15	Apr 27	<b>Chapter 86</b> Catalytic Converters	Catalytic Converter Testing and Diagnosis	<b><u>Due Tue</u></b> – <b><u>Due Thu</u></b> – Ch. 86 Quiz Questions
16	May 4	Lab Final		Lab Final

	<b>AUTO221N</b> <b>Automotive Heating and A/C</b> <b>Spring 2020</b>
<b>Department</b>	Industry and transportation
<b>Instructor</b>	Jason Felton
<b>NCC Email</b>	jfelton@ccsnh.edu
<b>Telephone Number</b>	(603)578-8950
<b>Office Hours</b>	Monday 2:00 – 4:00 Tues and Thurs 2:00 – 3:00
<b>Office Location</b>	Automotive Office
<b>Class Days/Meeting Time</b>	Class Tues and Thurs 3:00 – 3:50 Lab Monday 8:00 – 11:50
<b>Class Location</b>	Lecture H286 Lab Auto Building

### Rationale:

Climate control systems maintain a comfortable environment for the drive and passage of vehicles. This adds to the safety of the driver. These systems also maintain the proper operating temperature of the vehicle's engine. Servicing the AC system requires a license which is built into this course. Completion of the course will give the student the skill to diagnosis these systems and the license to repair them. Making the student much more valuable to an employer.

### Course Description:

The theory and operation of automotive heating, ventilation and air conditioning systems will be covered including safety, maintenance, adjustment, diagnosis and repair. Automatic climate control systems, air conditioning component repair and replacement procedures, refrigerant safety, recovery, recycling and recharge will be covered

### Course Competencies:

The student will learn to perform the tasks of a service technician in a safe, clean, neat and ethical manner.

The student will learn the theory of operation of automotive heating, ventilation and air conditioning systems including environmental concerns.

The student will learn proper diagnosis and repair procedures for automotive heating and ventilation systems.

The student will learn the proper diagnosis and repair procedures for Automotive air conditioning systems.

The student will learn to properly diagnose and repair manual heating, Ventilation and air conditioning controls.

The student will learn to properly diagnose and repair automatic climate Control system controls.

The student will learn the proper procedures for the safe handling of refrigerants used in automotive air conditioning systems.

### **Essential Questions:**

What is the most effective way to repair the vehicle?

Cost vs. Time vs. Risk

What is the root cause of the failure you are repairing?

Are there updated parts to address this issue?

### **Required Textbook(s):**

Today's Technician

Automotive Heating & Air conditioning

Mark Schnubel

ISBN: 978-1-305-49760-3

### **Supplemental Materials:**

Notebook and something to write with

Tool kit

### **Course Expectations:**

We understand that sometimes "life happens" and you cannot get to class on time or at all but, all students are expected to attend each class for the full amount of time scheduled. It is an important part of your education and we want you to be successful.

All lectures and labs begin on the hour.

Tardiness: All students will receive 2 "late entrances" to class. On the third time that student will not be allowed into class and will receive a zero for



that class. This will result in an absence and be counted towards the attendance policy for the AF grade.

Absences: Any student that will miss a class should notify the instructor by phone or email prior to the beginning of the class. All absences will result in accrued time towards the AF policy. Students are responsible for any make-up work, missed quizzes and exams due to absence. It is the instructor's discretion to allow make-up work, take a quiz or exam.

In this section, you must include your late work policy AND your make up policy unless your department has specific requirements posted below. You should also list other expectations that will help students succeed in your course and allow your classroom to function smoothly.

- There is a large safety portion to the course both personal and environmental. Because of this all proper procedures must be followed. When in doubt, ask.
- As a rule, there is no make-up work. If you are not going to make a class be sure, your homework assignment has been completed. Most assignments will be on Canvas. If it is a paper assignment, include it in the email stating you are going to be absent and you will receive full credit. Quizzes can be made up only if there was an email notifying the instructor of the absence. This must be made up prior to the next meeting of the class. It is the student's responsibility to do this.
- Most homework assignments will be end of chapter questions and will be on Canvas. Quizzes will be based on those homework assignments and giving in class on paper.
- All PowerPoint/class presentations on Canvas for you to review
- Should you have any question or concern you can email me. I normally will return an email within 48 hours.

### Grading:

5% -- Homework  
10% -- Quizzes  
35% -- Lab eval/Task sheets  
10% -- Mid-term Exam  
20% -- Lab Final Exam  
20% -- Final Exam

Grades will be assigned according to the following department scale:

A = 100 – 94

A- =	93 - 90
B+ =	89 - 87
B =	86 - 84
B- =	83 - 80
C+ =	79 - 77
C =	76 - 74
C- =	73 - 70
D+ =	69 - 67
D =	66 - 64
D- =	63—60
F =	59 or Below

### Available Support Services

**Tutoring, The Writing Center, Available Academic Services:** The Academic Success Center | located in the library offers academic support services which are open to all NCC students looking for additional help with their college assignments. Math tutoring and writing assistance are available. The Writing Center is for any student seeking assistance with the writing process for any class, not just College Composition. For more information and to view the tutoring schedules view here:

<http://www.nashuacc.edu/student-services/academic-success-center>

**Classroom Accommodations:** Students who have a documented disability (physical, learning, or mental health) and require reasonable classroom accommodations must meet with the Disabilities Support Coordinator to set up a NCC Reasonable Accommodation Plan (RAP). If you had an IEP or 504 in high school, you may qualify for a plan. If you would like more information or if you are not sure if you qualify for a plan, please contact Jodi Quinn, Disabilities Support Coordinator, located in The Academic Success Center in the library, 603-578-8900 ext. 1451. View additional information and the application here:

<http://www.nashuacc.edu/student-services/academic-success-center/disability-services> In order to receive classroom accommodations, it is the student's responsibility to meet with his/her instructor privately and provide a hard copy of the signed Reasonable Accommodation Plan (RAP) each term the student wants to utilize classroom accommodations even if the student has had that instructor in a previous term.

**Audio Record Classroom Lecture:** Please note that as a student in this class, you may have a classmate who by permission can audio record class lectures for his/her learning purposes. **Only students with prior written permission** from the instructor or the Disabilities Support Coordinator may audio record class lectures - *for educational purposes only*. Students who

audio record class lectures are prohibited from selling, transcribing, or distributing the recordings in *any manner* and are asked to delete the recordings when it is no longer essential for their learning purposes.

**Title IX Statement:** Classroom instructors at Nashua Community College are encouraged to create and maintain a safe learning environment in which students feel able to share opinions and related life experiences in classroom discussions, in written work, and in meetings with professors. To the greatest extent possible, this information will be kept private. However, staff and faculty have a legal obligation to report information concerning sexual misconduct, violence and exploitation of individuals per federal statute and in compliance with established policies and procedures at Nashua Community College. If you have been subjected to sexual misconduct, violence or exploitation, we encourage you to contact your Title IX representative Lizbeth Gonzalez, 603-578-8900 x1528\_or [lgonzalez@ccsnh.edu](mailto:lgonzalez@ccsnh.edu) for support and assistance.

Additional information including resources can be found at: New Hampshire Coalition against Domestic and Sexual Violence:  
[http://www.nhcadv.org/Catchment%20map\(1\).pdf](http://www.nhcadv.org/Catchment%20map(1).pdf)

### Department Policies

Cellphones, laptops, tablets and other electronic equipment should be shut off during class unless previously approved by instructor.

**For example:** lab tops/tablets are ok if you have purchased an electric copy of the textbook.

#### **Required Tools:**

All students are required to possess hand tools per the *Required Tool List*. Each student is expected to have the tools available for each lab session. The instructor reserves the right to refuse admission to (or dismiss from) lab any student who is not regularly prepared with the required tools. All tools should be at the college no later than the first Monday in October.

Students are expected to attend all their regularly scheduled classes, laboratory periods, and other academic exercises. Should an absence from regularly scheduled academic exercise be unavoidable (beyond a student's control), it will be the student's responsibility to communicate with the professor, preferably beforehand, concerning the absence. Documentation of said absence may be required by the professor.

Students are advised that absence from class, for whatever reason, does not excuse them from meeting course requirements and objectives.

**If a student is absent more than six hours (for a four-credit course, the total is eight hours) of class time during the term or semester, the instructor may withdraw the student from class using an AF grade, which means an F will be averaged into the GPA.** In addition to absences from class, tardiness and leaving class early also calculate into missed class time. To avoid this AF, if a student cannot continue to attend class for any reason, he/she should obtain a withdrawal slip from the registrar and follow the process to officially withdraw. Students should also understand an AF grade can be assigned by an instructor or an administrator at any time for reasons other than poor grade performance or failure to meet attendance requirements e.g., violation of the Student Code of Conduct, disruptive behavior, etc. Students should refer to the student handbook for additional information about the AF policy.

It is the responsibility of the student to make up any missed class work, homework assignment, quizzes, or tests in accordance with the instructor's make-up policy.

Depending on the instructor's policy, late papers may or may not be accepted for full credit. See this syllabus for policy details.

All assignments must be typewritten, unless otherwise instructed by the teacher. Any work that is not typewritten will not be accepted.

Specific policy details for the above are outlined in this syllabus.

Revised: 12/18/17

### College Policies

**AF Policy:** If a student misses more than the number of hours the course meets during a two-week period (e.g. six hours for a three credit course), the faculty may withdraw a student from the course with an "AF" grade. Please note that absences, tardies, and leaving class early all count towards "missed class time."

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Please be advised that if the behavior of any student (or students) continually disrupts the learning of his/her classmates, the following steps will be taken 1) verbal warning; 2) meeting with instructor and department

chair; 3) referral to Vice President of Academic Affairs and/or removal from the course with AF grade.

An "AF" grade is calculated in the GPA as an "F". Students should refer to the student handbook for additional information about the AF policy.

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24/7 Canvas Support: To access support through email, phone or chat

Click on the  icon. Students can also find guides, videos, and a Canvas community by clicking on the *CCSNH Resources* icon on the tool bar at the left of the Canvas screen then choosing Canvas Resources.

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Clinical	3 to 5	45-75
Practicum, Fieldwork	3	45
Internship	3 to 6	45-90
Co-op	Variable by Dept.	Variable by Dept.

## Course Calendar

Month/day	Topic	ASSIGNMENT DUE	Targeted Competencies*
Tuesday Jan 21	Ch 1 Heating and AC- history and the Environment	Ch 1 question, Multiple choice 1-10 E-Heat Transfer 27 E-Antifreeze gauge 19	Safety, and heating system components
Jan 27	Ch 2 Temperature and Pressure Fundamentals	Ch 2 questions, Multiple choice 1-10 E-Types of Heat 44 E-Climate control Heater 22	Temperature testing of versus components and outputs
Feb 3	Ch 3 Electricity and Electronic Fundamental	Ch 3 questions Multiple choice 1-10 E-Thermostatically Controlled Fan 33	Blower motors and Resistor packs
Feb 10	Ch 4 Engine Cooling and Comfort Heating Systems Quiz 221-1	Ch 4 questions, Multiple choice 1-10 E-Heater core 35 E-Electric Thermostat 13	Cooling systems, Thermostats, Block heaters
Feb 17	Ch 10 Air Distribution Systems	Ch 10 questions, Multiple choice 1-10 E-Climate Control: Comfort Basics 38 E-Climate Control: Operation 56	HVAC heater Box Air distribution methods
Feb 24	Ch 11 System controls Quiz 221-2	Ch 11 question, Multiple choice 1-10 E-Climate: Accumulator 52	Inspect and diag various control systems
Mar 2	Ch 5 AC Systems Operating Principles	Ch 5 questions, Multiple choice 1-10 E-Climate: Compressor 73 E-Climate: Condenser 37	Pressure testing AC systems and How temperature affects pressure
Mar 9	Midterm Exams	E-Climate: Evaporator 49 E-Climate: Filter Drier 50	AC System Component ID and Electrical Testing
Mar 15	Spring Break	E-A/C Protection 61 E-Sniffer Leak Detection 29 E-UV Leak Detection 28	
Mar 23	Ch 6 Refrigeration System Components Quiz 221-3 Components	Ch 6 questions, Multiple choice 1-10 E-Metering Principles 38 E-Fixed Orifice 44 E-Variable Orifice 54	AC System Component ID and Electrical Testing
Mar 30	Ch7 Refrigerant System Servicing and Testing	Ch 7 questions, Multiple choice 1-10 E-Working Principle 50 E-A/C: Operation 15 E-Magnetic Coupling 22	AC Recovery and Recharging
April 6	Ch 8 Diagnosis of Refrigeration Systems 221-4 Service and Diag	Ch 8 questions, Multiple choice 1-10 E-Refrigerant Recovery and Filling 68 E-Pipes, Hoses and Couplings 47	AC System Diagnosis
April 13	Ch 9 Compressors and Clutch	Total E-time 1037m/17.0	Inspect clutch clearances and replace compressors
April 20	Ch 12 Retrofits and Hybrid Systems	E-Post Test HVAC	Complete all Projects
April 27	Review for Final Exam & Written Final Exam	<b><u>All Self-studies are required to be completed to be eligible for Final Exam</u></b>	

**This schedule is subject to change. In the event of class cancellation due to inclement weather or instructor illness, students are directed to the course Canvas site for an alternate assignment for that day**



 <b>Nashua Community College</b>	<b>Engine Repair AUTO228N Spring 2020</b>
<b>Department</b>	<b>Industry and Transportation</b>
<b>Instructor</b>	Tim Hogan
<b>NCC Email</b>	thogan@ccsnh.edu
<b>Telephone Number</b>	603-578-6885
<b>Office Hours</b>	Tues+Thurs 3:00-3:50 Wed+Fri 2:00-2:50
<b>Office Location</b>	Automotive Building, new office
<b>Class Days/Meeting Time</b>	Tues and Thurs 1:00-1:50, lab Fri 8:00-1:50
<b>Class Location</b>	Lecture H286 Lab Auto Bldg, main shop and Rm33

## Rationale / Course Description:

This course is designed to give students a better understanding of current practices involved in the diagnosis, disassembly, cleaning, repair and reassembly of today's modern engines. Topics for this course will include engine diagnostic procedures, engine removal practices, proper teardown, cleaning and inspection processes, best practices for component repair/replacement, reassembly and engine reinstallation. There will also be discussion about engine design, performance modifications and specifics regarding certain engine features that are manufacturer specific. This course is designed to meet all of the requirements for NATEF certification in the Engine Repair section. There is also a Capstone Assignment that is part of this course.

## Course Competencies:

Understand basic engine theory to properly diagnose engine mechanical failures

Understand proper engine removal procedures

Understand proper teardown and cleaning procedures

Identify cause of failure and appropriate repair procedure

Understand proper engine repair processes

Understand proper reassembly procedures for engine mechanical parts

Understand how to safely and efficiently reinstall an engine

## Essential Questions:

What is the most effective way to repair the vehicle?

Cost vs. Time vs. Risk

What is the root cause of the failure you are repairing?

Are there updated parts to address this issue?

## Required Textbook(s):

Automotive Technology Principles, Diagnosis, and Service Fifth edition

James D. Halderman

978-0-12-399461.2

## Supplemental Materials:

Notebook and something to write with

Required Tool kit

## Course Expectations:

We understand that sometimes “life happens” and you cannot get to class on time or at all but, all students are expected to attend each class for the full amount of time scheduled. It is an important part of your education and we want you to be successful.

All lectures and labs begin on the hour.

Tardiness: All students will receive 2 “late entrances” to class. On the third time that student will not be allowed into class and will receive a zero for that class. This will result in an absence and be counted towards the attendance policy for the AF grade.

Absences: Any student that will miss a class should notify the instructor by phone or email prior to the beginning of the class. All absences will result in accrued time towards the AF policy. Students are responsible for any make-up work, missed quizzes and exams due to absence. It is the instructor’s discretion to allow make-up work, take a quiz or exam.

In this section, you must include your late work policy AND your make up policy unless your department has specific requirements posted below. You should also list other expectations that will help students succeed in your course and allow your classroom to function smoothly.

- With this class the jobs assigned for the lab tend to last multiple labs if not the entire semester. Time run out quickly. It is expected the students use their lab time efficiently. This means the student should do research on parts, procedure, special tool etc outside of lab time. This will help to avoid wasting a lab/week because a part or tool was not on hand when needed.
- As a rule, there is no make up work. If you are not going to make a class be sure, your homework assignment has been completed. Most assignments will be on Canvas. If it is a paper assignment, include it in the email stating you are going to be absent and you will receive full credit. Quizzes can be made up only if the was an email notifying the instructor of the absent. This must be made up prior to the next meeting of the class. It is the students responsibility to do this.
- Most homework assignment will be end of chapter questions and will be on Canvas. Quizzes will be based on those homework assignments and giving in class on paper.
- All powerpoint/class presentations on Canvas for you to review
- Should you have any question or concern you can email me. I normally will return an email within 48 hours.

## Grading:

Include a grade weight breakdown showing the specific components of the student's final grade. For example:

15% -- Homework from text book

15% --Quizzes

20% --Daily lab eval/Task sheets, please see the **Daily Lab Evaluation** sheet

25% -- Mid-term Exam

25% -- Capstone project

Grades will be assigned according to the department scale:

Point/letter grade equivalents:

100-94: A

93-90: A-

89-87: B+

86-84: B

83-80: B-

79-77: C+

76-74: C

73-70: C-

69-67: D+

66-64: D

63-60: D-  
Below 60: F

## Available Support Services

**Tutoring, The Writing Center, Available Academic Services:** The Academic Success Center | Room 100 offers academic support services which are open to all NCC students looking for additional help with their college assignments. Math tutoring and writing assistance are available. The Writing Center is for any student seeking assistance with the writing process for any class, not just College Composition. For more information and to view the tutoring schedules view here: <http://www.nashuacc.edu/student-services/academic-success-center>

**Classroom Accommodations:** Students who have a documented disability (physical, learning, or mental health) and require reasonable classroom accommodations must meet with the Disabilities Support Coordinator to set up a NCC Reasonable Accommodation Plan (RAP). If you had an IEP or 504 in high school, you may qualify for a plan. If you would like more information or if you are not sure if you qualify for a plan, please contact Jodi Quinn, Disabilities Support Coordinator, located in The Academic Success Center (Room 100), 603-578-8900 ext. 1451. View additional information and the application here: <http://www.nashuacc.edu/student-services/academic-success-center/disability-services> In order to receive classroom accommodations, it is the student's responsibility to meet with his/her instructor privately and provide a hard copy of the signed Reasonable Accommodation Plan (RAP) each term the student wants to utilize classroom accommodations even if the student has had that instructor in a previous term.

**Audio Record Classroom Lecture:** Please note that as a student in this class, you may have a classmate who by permission can audio record class lectures for his/her learning purposes. **Only students with prior written permission** from the instructor or the Disabilities Support Coordinator may audio record class lectures - *for educational purposes only*. Students who audio record class lectures are prohibited from selling, transcribing, or distributing the recordings in *any manner* and are asked to delete the recordings when it is no longer essential for their learning purposes.

**Title IX Statement:** Classroom instructors at Nashua Community College are encouraged to create and maintain a safe learning environment in which students feel able to share opinions and related life experiences in classroom discussions, in written work, and in meetings with professors. To the greatest extent possible, this information will be kept private. However, staff and faculty have a legal obligation to report information concerning sexual misconduct, violence and exploitation of individuals per federal statute and in compliance with established policies and procedures at Nashua Community College. If you have been subjected to sexual misconduct, violence or exploitation, we

encourage you to contact your NCC Title IX representative Lizbeth Gonzalez, 603-578-8900 x1528\_ or [lgonzalez@ccsnh.edu](mailto:lgonzalez@ccsnh.edu) for support and assistance. You may also contact Bridges, the local crisis center, for free and confidential services at their 24hr support line 603-883-3044. You do not need to be in crisis to call.

Additional information including resources can be found at:

New Hampshire Coalition Against Domestic and Sexual Violence:  
[https://www.nhcadv.org/uploads/1/0/7/5/107511883/nhcadv\\_catchment\\_map.pdf](https://www.nhcadv.org/uploads/1/0/7/5/107511883/nhcadv_catchment_map.pdf)

uSafeUS <https://usafeus.org/app3/webviewer.html>

Bridges <https://www.bridgesnh.org/>

**Additional Student Support Services:** Information on additional support services for NCC students can be found at <http://nashuacc.edu/student-services/where-to-find-assistance-at-ncc>

## Department Policies

Cellphones, laptops, tablets and other electronic equipment should be shut off during class unless previously approved by instructor.

**For example:** lab tops/tablets are ok if you have purchased an electric copy of the textbook.

### **Required Tools:**

All students are required to possess hand tools per the *Required Tool List*. Each student is expected to have the tools available for each lab session. The instructor reserves the right to refuse admission to (or dismiss from) lab any student who is not regularly prepared with the required tools. All tools should be at the college no later than the first Monday in October.

**Shop Policies:** See Shop Policies posted under the Files tab in Canvas.

## College Policies

**AF Policy:** If a student misses more than the number of hours the course meets during a two-week period (e.g. six hours for a three credit course), the faculty

may withdraw a student from the course with an "AF" grade. Please note that absences, tardies, and leaving class early all count towards "missed class time."

Students should also understand an AF grade can be assigned by an instructor or an administrator at any time for reasons other than poor grade performance or failure to meet attendance requirements e.g., violation of the Student Code of Conduct, disruptive behavior, etc.

Please be advised that if the behavior of any student (or students) continually disrupts the learning of his/her classmates, the following steps will be taken 1) verbal warning; 2) meeting with instructor and department chair; 3) referral to Vice President of Academic Affairs and/or removal from the course with AF grade.

An "AF" grade is calculated in the GPA as an "F". Students should refer to the student handbook for additional information about the AF policy.

**Canvas:** All instructors at NCC will be using Canvas. Canvas is the online learning management system used by instructors and learners at Nashua Community College. Instructors may post syllabi, course related documents and grades in Canvas. Students may be required to submit assignments and/or take assessments through Canvas and/or participate in discussion boards.

To directly link to Canvas On Demand tutorials, please visit the following link:

[https://community.canvaslms.com/community/answers/guides/video-guide#jive\\_content\\_id\\_Students](https://community.canvaslms.com/community/answers/guides/video-guide#jive_content_id_Students)

If you have forgotten your Easy Login Password information, please visit the following link: <https://password.ccsnh.edu/accounts/Reset>

**If class is ever cancelled because of instructor illness or inclement weather, students will need to check Canvas for their assignments.**

**College Email System:** Nashua Community College has established a College electronic mail ("email") system as a means of the College sending official information to enrolled students, and for students to send communication to their instructors and College personnel. All students registered at NCC will be assigned a College email account/address to be used as the only email address for all email communication: 1) sent to the students from their instructors and from all College personnel; and, 2) sent by the students to their instructors and to all College personnel.

In addition:

- Students should check their College email account regularly to ensure they are staying current with all official communications. Official

- communication includes, but is not limited to, policy announcements, registration and billing information, schedule changes, emergency notifications and other critical and time sensitive information.
- Students should also check their college email account to be sure that they are current with all email communication from their faculty.
  - The student email account/address should be the only e-mail address students use to send email to faculty and College personnel so that student email is recognized and opened.
  - This service is provided exclusively to the students of NCC. Accounts are for individual use only, and are not transferable or to be used by any other individual.
  - Students using their College email account do so under the policies set forth in the Student Handbook under "Student Computer Conduct Code".

**Sensitive Materials Policy:** During the semester, in order to cover certain academic topics, there may be occasions to view or discuss material which may not meet the student's own personal definition of appropriateness. At such times, every student has the right to decide not to participate. Every effort will be made by the instructor to notify students in advance of when such sensitive material will be used so that students can make alternative arrangements. Faculty will guide students in the identification of alternate learning opportunities consistent with relevant course objectives so that students opting out of scheduled "sensitive" learning experiences will not be penalized academically in any way. Please note the opportunity to leave the classroom discretely is always available to each student when such sensitive material is being discussed. The student then has the responsibility before the next class meeting to inform the instructor as to the reason for leaving.

**Plagiarism Policy:** Plagiarism is a serious violation of a student's academic integrity and the trust between a student and his or her teachers. Plagiarism is the act of a person presenting another person's work as if it were his or her own original work. Such acts of plagiarism include, but are not limited to:

1. A student submitting as his or her own work an entire essay or other assignment written by another person.
2. A student taking word for word a section or sections of another person's work without proper acknowledgment of the source and that the material is quoted.
3. A student using statistics or other such facts or insights as if these were the result of the student's efforts and thus lacking proper acknowledgment of the original source.
4. The paraphrasing of another person's unique work with no acknowledgment of the original source.
5. Copying another student's work on a quiz or test.

When a student is found to have plagiarized an academic assignment, it will be up to each instructor to determine the penalty. Depending on the severity of the

incident, this could range from a warning to a loss of credit for the assignment. In all cases of plagiarism, the student's advisor will be notified and the incident will be documented. If any further incidents of plagiarism are reported to the student's advisor, additional sanctions will be imposed. These may include notification of the Vice President of Academic Affairs; loss of credit for the course; suspension or dismissal from a department program; academic probation; and/or expulsion from the College.

### **Credit Hour Guidelines**

1. A credit hour shall be the equivalent of one (1) hour of classroom or direct faculty instruction and a minimum of two (2) hours of out-of-class student work each week for 15 or 16 weeks.
2. A credit hour shall be allocated based on the following:

Category	Contact Hours per Week	Contact Hours per Sem. (based on minimum 15 week semester)
Class	1	15
Laboratory	2 or 3	30-45
Clinical	3 to 5	45-75
Practicum, Fieldwork	3	45
Internship	3 to 6	45-90
Co-op	Variable by Dept.	Variable by Dept.

## **Course Calendar**



Week #	Month /day	LECTURE/DISCUSSION	ASSIGNMENT DUE	Target Competencies
1	Tuesday Jan 21	How to buy a car To rebuild or not to rebuild Shop rules Chapter 1 and 2		Lab safety, Engine condition diagnosis
2	Jan 28	Chapter 26 Engine Condition Diagnosis	Ch. 26 Chapter Quiz 1-10	In vehicle servicing Chapter 27
3	Feb 4	Chapter 28 Engine Removal and Disassembly	Ch. 28 Chapter Quiz 1-10	Engine removal and disassembly
4	Feb 11	Chapter 29 Cleaning, Inspection and Crack Detection	Ch. 29 Chapter Quiz 1-10	Cleaning, Inspection and Crack Detection. Measure cylinders Order Parts
5	Fed 18	Chapter Balancing and Blueprinting		CC'ing a head continued work Send blocks to machine shop
6	Feb 25	Chapter 30 Cylinder Head Service	Ch. 30 Chapter Quiz 1-10	Cylinder head inspection Warpage and valve guides
7	Mar 3	Chapter 31 Valve and Valve Seat Service	Ch. 31 Chapter Quiz 1-10	Grind valves and cut seats
8	Mar 10	Review for Mid-Term Mid-term exam	Review for Mid-Term	Continue work on cylinder heads
	Mar 16-20	SPRING BREAK		
9	Mar 24	Chapter 32 Camshafts and Valvetrains	Ch. 32 Chapter Quiz 1-10	Reassemble cylinder heads
10	Mar 31	Chapter 33 Pistons, Rings, Connection Rods	Ch. 33 Chapter Quiz 1-10	Blocks back from machine shop Measure and set piston ring end gap
11	Apr 7	Chapter 34 Engine Blocks	Ch. 34 Chapter Quiz 1-10	Clean and prep block for reassembly
12	Apr 14	Chapter 35 Crankshafts, Balance Shafts and Bearings	Ch. 35 Chapter Quiz 1-10	Install crankshaft, measure oil clearances and end play
13	Apr 21	Chapter 36 Gaskets and sealants Chapter 37 Engine assembly	Ch. 36 Chapter Quiz 1-10	Reassemble bottom end
14	Apr 38	Capstone Presentations	Study and review all chapters to date.	Install engines and run
15	May 5	Finals week		

\*Targeted competencies refer to the established course competencies listed above.

**This schedule is subject to change. In the event of class cancellation due to inclement weather or instructor illness, students are directed to the course Canvas site for an alternate assignment for that day.**