	<b>Internal Combustion Engine AUTO106N Fall 2020</b>
<b>Department</b>	Transportation
<b>Instructor</b>	Tim Hogan
<b>NCC Email</b>	thogan@ccsnh.edu
<b>Telephone Number</b>	603-578-6885
<b>Office Hours</b>	Monday 10:00-10:50 Wednesday 10:00-10:50, 2-2:50
<b>Office Location</b>	Automotive Building
<b>Class Days/Meeting Time</b>	Lecture: Tuesday 8:00-8:50 Lab: Thursday 9:00-11:50
<b>Class Location</b>	Lecture: Gregg Hall Auditorium Lab: Auto building Room 33, off main shop

### **Rationale:**

Internal combustion engine is one of the 3 foundation classes for the Automotive program.

### **Course Description:**

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

## Course Competencies:

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

## 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 Service, 5TH Edition.

Tim Gilles

ISBN 978-1-3051-1059-5

## Supplemental Materials:

notebook

## Course Expectations:

Including but not limited to:

Students are responsible for completing assignments on time.

Students are expected to take notes. Not all covered material is in the book.

Students are expected to be professional and courteous.

Students are expected to arrive on time for classes/labs.

Students are expected to have the essential books/supplies/tools.

Students must maintain appropriate personal hygiene

Protective eyewear is required in any lab (shop).

Food is prohibited in all labs and classrooms during classes.

Lab service bays must be cleaned and/or washed at the end of each lab session.

All students must contribute to the clean-up process.

No students will be dismissed from lab session until service bays are clean.

There is no make up for this class. Assignments are due at the beginning of class and are listed on the course calendar. If you are going to miss a class, you must email the assignment that is due that day before that class meets. If there is a quiz that day and you emailed me that you will not be able to attend, you will be allowed to make up that quiz. It is your responsibility to meet with me BEFORE the next lecture meets to take said quiz.

## Grading:

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

Grading Weights:

10% Homework/from text  
10% Quizzes  
20% Midterm  
20% Written Final Exam  
20% Lab Eval  
20% Lab practical Exam

<b>Work Habit or Trait</b>	<i>Description</i>	<b>1 to 5 Scale Evaluations</b>
Job knowledge	Overall knowledge or understanding of all aspects pertinent to the job (Materials equipment, techniques, product knowledge, etc).	
Quality of work	Accuracy, thoroughness, and neatness	
Quantity of work	Number of tasks performed during work period meets expectations	
Dependability	Punctuality and attendance, reliability in carrying out work assignments, amount of supervision required and conscientiousness.	
Behavior	Enthusiasm for job, level of cooperation with associates, supervision, etc. Receptivity to changes and new duties. Resourcefulness and versatility and safety	

### Daily Lab Evaluation

1=Student performs below expectations

3=Student performs satisfactorily with periodic supervision

5=Student demonstrates outstanding performance

Because of the safety related to this course a student must earn a minimum of a 15 or better for their overall grade to pass the lab portion of the course.

5 points = 0/F

10-15 points = 45/F

Minimum passing score- 15 points = C/75

20 point = B/85

Maximum score- 25 points = A/100

## 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

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

## Transportation Technologies Attendance Policies:

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 be allowed 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.

### Make Up Policy

There is no make-up work. If you will miss a class, you may email your homework assignment, before the class meets, to me for full credit. There will be one extra credit assignment at the end of the semester.

There is no provision for make-up of a midterm exam, final exam, or lab practical exam.

### 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.

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.

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 assignment.

**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.

**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.**

**AUTN106N Course Calendar (Subject to Change), Fall 2020**

Week #	Begins	LECTURE/DISCUSSION	LAB	ASSIGNMENTS DUE Thursdays Chapter Review
1	Tuesday Sep 1	Chapter 6 Review syllabus Introduction to the Engine	Introduction, Safety and hardware Review Ch6	Review Ch1,6,7
2	Sep 8	Chapter 15 Gasoline Engine Operation Basic 4 stroke quiz, 106-1	Vernier caliper Review Ch6	Ch15 Review 1-10, ASE 1-5
3	Sep 15	Chapter 16 Engine Classifications Blocks, Diesel, 2 stroke, Wankel	Micrometer	Ch16 ASE 1-10
4	Sep 22	Chapter 17 Engine Size and Measurements Quiz on Chapters 15, 16 and 17 106-2	Test run engines and begin disassembly. Vernier Caliper quiz	Ch17 Review 1-10, ASE 1-5
5	Sep 29	Chapter 18 up to page 271 Engine Upper End	Check valve lash clearance and lift, Measure valve guides and stems	Chapter 18 up to page 271
6	Oct 6	Chapter 18 from page 272 Engine Upper End(advanced cam timing) Quiz on chapter 18, 106-3	Measure cylinder bore and stroke, Remove piston and crankshaft	From page 272 ASE 1-5 and ASE 1-5
7	Oct 13	Chapter 19 Engine Lower (Bottom) End	Disassemble and inspect all components Valve guide measurement quiz	Ch19 Review 1-10, ASE 1-5
8	Oct 20	Review for the Mid Term Assign extra credit report	Measure piston, cylinder bore and crankshaft Begin reassembly	Review for Mid-Term
9	Oct 27	Chapter 42 up to p792 Intake and Exhaust Systems Quiz on chapter 42	Continue reassembly	Review Ch42
10	Nov 3	Chapter 42 up to p792 Intake and Exhaust Systems Quiz on chapter 42 106-4	Disassemble carburetor, check/set float level. Piston and cylinder quiz	Review Ch42
11	Nov 10	Chapter 42 from p792 Turbocharges, Blowers, and Nitrous Quiz on Turbos and Blowers, 106-5	Continue work on carbs	Ch42 ASE 1-10
13-1	Nov 17	Chapter 40 Fuel System Fundamentals, carburetors Quiz on Ch40	Finish Reassembly	Review Ch40
13-2	Nov 24	Fuel System Fundamentals, EFI Quiz on Ch40, 106-6	Test Run engines	Ch40 ASE 1-5
14	Dec 1	Chapter 37 Ignition System Fundamentals	Bug engines and diag for No-Start, low power output.	Review Ch37
15	Dec 8	Chapter 39 Petroleum Fuels and Alternative Fuel Technologies Begin Review and Written final Exam	Bug engines and diag for No-Start, low power output.	Review Chapter 39 Study and review all chapters to date.
16	Dec 14- 17	Lab Exam Schedule TBA		

Updated: 8/2020