Nashville State Community College  
Business, Applied Arts & Technologies Division  
Automotive Department/ GM ASEP Program

Course Syllabus

GM Automotive Engines  
AMT- 2230  
3 Credits, 2 Class Hours, 3 Laboratory Hours  
Instructor: Claude Whitaker

Instructor: Claude Whitaker  
Office: W-58  Phone: 353-3449  
Hours M - T- W 7:00-3:00  R- 7:00-2:00  F- 8:00-12:00  
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Textbook and Other Materials:  
Automotive Technology 4th edition, James D. Halderman, General Motors Fundamental  
Curriculum Series Automotive Engines, Jeffrey Rehkopf, IAGMASEP 2003 Training Material

Supplemental material All Computer Based Training CD’s, Service Know How videos, and  
Web Based Training IDLs are required to be completed for GM hands-on certification to be  
granted.

Course Description

This is a comprehensive course in the operational theory of the internal combustion engines  
currently use in General Motors vehicles. Topics include engine rebuilding, mechanical  
diagnosis and failure analysis. Prerequisite: AMT 1100

Course Outcomes:  
Upon completion of this course, the student should be able to:

1. Explain, using a working model training aid, the operational concepts of the internal  
combustion engine.

2. Correctly grind valves, using proper safety procedures.

3. Install timing chain and adjust engine timing.

4. Replace rod and main bearing, oil pump, cam shaft and lifters.

5. Measure “clearances” in an engine.
Course Assessments:
The student will be required to pass a series of on-the-car hands-on tasks set by the GM Service Technical College and the NATEF task list. (Task I. Engine Repair)
Evidence that the tasks have been met, the student will identify and interpret engine repair concern: determine necessary action. Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions and technical service bulletins. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals.) Inspect engine assembly for fuel, oil, coolant and other leaks; determine necessary action. Perform engine vacuum tests; determine necessary action. Perform cylinder power balance tests; determine necessary action. Perform cylinder compression tests; determine necessary action. Perform cylinder leakage tests; determine necessary action. Remove and reinstall engine in a late model front-wheel drive vehicle (OBDI or newer); reconnect all attaching components and restore the vehicle to running condition. Install cylinder heads and gaskets; tighten according to manufacturer’s specifications and procedures. Adjust valves (mechanical or hydraulic lifters). Inspect and replace timing belts (chains), overhead camdrive sprockets and tensioners; check belt/chain tension; adjust as necessary. Establish camshaft(s) timing and cam sensor indexing according to manufacturer’s specification and procedures. Disassemble engine block; clean and prepare components for inspection and reassembly. Deglaze and clean cylinder walls. Inspect crankshaft for end play, straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition, measure journal wear, check crankshaft sensor reluctor ring (where applicable); determine necessary action. Inspect and measure piston; determine necessary action. Inspect, measure and install piston rings. Assemble the engine using gaskets, seals and form-in-place (tube-applied) sealants, thread sealers, etc. according to manufacturer’s specifications. Perform oil pressure tests; determine necessary action. Perform cooling system cap and recovery system tests (pressure, combustion leakage and temperature); determine necessary action. Inspect, replace and adjust drive belts, tensioners and pulleys; check pulley and belt alignment. Inspect and replace engine cooling and heater system hoses. Test coolant; drain and recover coolant; flush and refill cooling system with recommend coolant; bleed air as required. Inspect, test, remove and replace water pump. All these tasks will be observe by me on a one-on-one basic when in the shop.

Grading Policy:
Grading of class:                                      Letter grade conversions:
Assignment /Lab Sheets                                  A (90-100)
Unit & Mid-Term Tests (4)                               B (80-89)
Hands-on Components                                    C (70-79)
Final Test                                              D (60-69)

Lab Sheets are based on hands-on performance tasks per the GM Service Technical College and the NATEF task list.

NOTE: If the AVERAGE TOWARD FINAL GRADE is 90 or above (+ - assignments and lab sheets) you do not have to take the FINAL TEST.
If you have to take the FINAL TEST, the AVERAGE TOWARD FINAL GRADE and FINAL TEST are averaged for the FINAL LETTER GRADE.

**Laboratory Guidelines**

- Horseplay will not be tolerated
- When working under an automobile, you must use a creeper
- Use all hand or special tools properly

- Do not sit in an automobile unless you are making a check or test that requires you to
- Do not run the radio or change radio setting
- Do not move the seat unless necessary
- You must use fender covers when working under the hood
- Do not use any part of an automobile for a work bench
- Every automobile must have a work order on it
- Every automobile jacked up must have jack stands under it
- You must wear safety glasses when doing the following
  - Turning a drum/rotor
  - Grinding
  - Re-facing a valve
  - Balancing a wheel
  - Drilling holes
  - Using a blow gun

**Topics to Be Covered:**

**Week 1/2 - Engine Fundamentals**
- History
- Basic Factors (i.e. heat, pressure, temperatures, etc.)
- Piston Engine Operational Concept/Construction

**Week 3 - Component Identification and Function**
- Part Identification
- Power Tool (Engine) Operation

**Week 4 - Engine Operation (Detailed)**
- Cylinder Head
- Manifolds
- Diagnose/Analyze Top-Half Engine Failures

**Week 5 - Top Half Disassembly and Measurement**
- Disassemble/Reassemble Top Half of Engine
- Correctly Use Engine Instruments of Measurement

**Week 6/7 - Valve Reconditioning**
- Correctly Service Cylinder Head and Valve Train Assembly
- Grind Valves
- Engine System
- Identify Engine Systems (Fuel, Air, F/A Mixing, Exhaust and Lubricating).
Attendance Policy
A student is expected to attend all scheduled classes and laboratories. Each instructor will formulate an attendance policy and provide it on the course syllabus. Absences are counted from the first scheduled meeting of the class, and it is the responsibility of each student to know the attendance policy of each instructor in whose class he/she is enrolled. If a student is absent from a class, he/she should give an advanced explanation to the instructor. Absences in a course may affect a student’s final grade. The student is responsible for all assigned work in the course regardless of excused or unexcused absences. Tardiness may also affect a student’s final grade.
Failure to attend class will result in a final course grade of “FA” or “FN” (see explanation below) depending on the individual instructor’s course policy.
FA= failure, attendance-related (unofficial withdrawal) Last recorded date of attendance required.
FN= failure, never attended class (unofficial withdrawal)

Student Communication Channels
It is the student’s responsibility to check D2L and MyNSCC email on a regular basis. These are the official communication channels between the college and students. Students are responsible for the information communicated through those channels. D2L contains specific course information and MyNSCC contains information important for other purposes.

Early Warning System
Nashville State Community College has implemented an Early Warning System to notify students via e-mail about academic problems such as poor classroom attendance, poor performance on assignments/tests, poor communication skills, late/missing assignments, and/or lack of classroom participation. Please note that Early Warning Alerts do not affect a student’s academic standing.

ADA Compliance Statement
Nashville State complies with the Americans with Disabilities Act. If you wish to request any special accommodations for any courses in which you are enrolled, contact the Student Disabilities Office at 353.3721.

Classroom Misconduct
Nashville State Community College has a zero tolerance policy for disruptive conduct in the classroom. Students whose behavior disrupts the classroom will be subject to disciplinary sanctions. Please consult your Student Handbook for more specific details.
The instructor has primary responsibility for control over classroom behavior and maintenance of academic integrity. He/she can order temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or in conduct which violates the general rules and regulations of the College.
Disruptive behavior in the classroom may be defined as, but is not limited to, behavior that obstructs or disrupts the learning environment (e.g., offensive language, harassment of students and professors, repeated outbursts from a student which disrupt the flow of instruction or prevent concentration on the subject taught, failure to cooperate in maintaining classroom
decorum, etc.), the continued use of any electronic or other noise or light emitting device which disturbs others (e.g., disturbing noises from beepers, cell phones, palm pilots, lap-top computers, games, etc.). Please be aware that children are not allowed in class or unattended on campus.

**Academic Dishonesty (Honor Code)**

Any form of academic dishonesty, cheating, plagiarizing, or other academic misconduct is prohibited. “Plagiarism may result from: (1) failing to cite quotations and borrowed ideas, (2) failing to enclose borrowed language in quotation marks, and (3) failing to put summaries and paraphrases in your own words (A Writer’s Reference 331). Academic dishonesty may be defined as, but is not limited to, intentionally trying to deceive by claiming credit for the work of another person, using information from a web page or source without citing the reference, fraudulently using someone else’s work on an exam, paper, or assignment, recycling your own work from another course, purchasing papers or materials from another source and presenting them as your own, attempting to obtain exams/materials/assignments in advance of the date of administration by the instructor, impersonating someone else in a testing situation, providing confidential test information to someone else, submitting the same assignment in two different classes without requesting both instructor’s permission, allowing someone else to copy or use your work, using someone else’s work to complete your own, altering documents, transcripts or grades, and forging a faculty/staff member’s signature. In addition to other possible disciplinary sanctions that may be imposed through regular college procedures as a result of academic dishonesty the instructor has the authority to assign an “F” or a “Zero” for the exercise, paper, or examination or to assign an “F” for the course. Students may appeal through the appropriate college grade appeal procedures.

**Inclement Weather Policy**

In the event of an inclement weather event, check the Nashville State web site home page at www.nscc.edu for announcements on campus closures. Campus closures will also be announced on local television stations (channels 2, 4, 5, and 17). When classes are cancelled, an online assignment will be posted in NS Online. Check your NS Online email for a message from your instructor regarding your online assignment requirements. Even though classes may be cancelled, some areas, i.e. Testing Center, may be open. However, you should check before commuting to campus. The Vice President for Academic Affairs and the Director of Security are responsible for cancellation decisions during an inclement weather event for the Nashville State main campus and the Southeast campus. Cookeville, Waverly, and Dickson Campus Directors will make class cancellation decisions based on conditions in their respective areas. Decisions about class cancellations are based on actual conditions, not forecasts. The perspective used for making decisions is that of the college as an employer, not as a K-12 institution. Students should use their own best judgment in determining whether to report to campus during inclement weather when classes are not cancelled.

**NOTE:** This syllabus is meant simply as a guide and overview of the course. Some items are subject to change or may be revised at the instructor’s discretion. Each instructor will further clarify their criteria for grading, classroom procedures, attendance, exams and dates, etc. on his/her course syllabus.