**LYONS TOWNSHIP HIGH SCHOOL DISTRICT 204**

**Applied Arts/Tech**

**LTCC: Automotive Service & Diagnostics - Level 4 - Grades 12 – Year Long Course**

**Course Syllabus**

**Course Standards:**

Automotive Service and Diagnostics is the capstone course of the Automotive Program. Special emphasis will be on diagnostic procedures. Students will become proficient using industry standard equipment such as scan tools, digital oscilloscopes, emissions gas analyzers, digital multi-meters, power tools, and more. Students will have the opportunity to complete live lab work on a variety of vehicles/manufactures, communicate as a service consultant with the vehicles respective owners, set up appointments, and manage lab teams. Students will finally disassemble and reassemble a variety of automotive engines and will test them for proper operation.

**Core Instructional Resources:**

This class will be taught through note guided lecture, discussion, and lab work. Students will conduct labs through many different models of cars, owned by themselves, the school, and the faculty. Students will become proficient in using hand/power tools, overhead lifts, along with other general and diagnostic shop equipment.

**Supplementary Instructional Resources:**

*Materials:*  Pen, Pencil, Paper, Student notebook, Safety Glasses (Z87 approved), Shop clothes and shoes (optional), NATEF Job Sheets Work Book , All Data

Resources: Classroom auto book, Library, Internet, and Magazines

**Media (film, video, etc.), Field Trips, Guest Speakers, etc:**

Media:

- Various Automotive VHS, YouTube, and DVD

- Power Point Presentations

Trips: - Chicago Auto Show

* UTI Diagnostic Competition
* UTI Top Tech Challenge

Guest Speakers:

* Universal Technical Institute
* Wyoming Technical Institute

**“Other” LTCC Exclusive Opportunities:**

* Dealership (Spring/Winter break Internships) 10 Students
  + Job Offers over summer
* Engine rebuild Competition (Nationally Qualifying) 5 Students
* Auto Club (Wednesdays 3:00-5:30) Room 176 NC

**Major Projects/Performance: Spring**

**S - Complete Engine Teardown and Rebuild:** 1/3 of final grade

Students will completely disassemble an automotive engine down to the bare crank. After measuring and inspecting the vehicles engine it will then be 100% reassembled and checked for correctness.

**S - Technician Training & Experience:** 1/3 of second semester grade final grade

Students will have the chance to work on a daily basis in the lab on their own, staff, or parent’s cars. Each day will consist of live work and groups will be split up into different responsibilities/job roles; (Service managers, Tool managers and Technicians) each day the job roles will rotate allowing each student to experience each job title.

**Homework Policy:**

- Late work will be accepted up to 3 days.

- Each day an assignment is late 15% of the overall grade will be deducted.

-After 3 days the assignment will no longer be eligible to turn in.

DON’T MISS LABS!

-Labs must get signed within 24 hrs of completing the lab. Failure to do so will result in a 0 and must be made up on YOUR free time. (Study Hall, Lunch, Before/After School)

**Grading Scale:**

The student will be graded using quizzes, exams, homework, and lab write-ups. Total points will be calculated to determine the grade for the class…. *There is no rounding up!*

**100-90 (A) 89.9-80 (B) 79.9-70 (C) 69.9-60 (D) 59.9-0 (F)**

**% of Each?**

Homework- 20%

Exams- 45%

Labs- 35%

Final Exam- 20%

**Lab Behavior**

When in lab, ***SAFETY*** is #1 priority. Any act deemed unsafe by teacher, the student will be sent to the classroom and receiving a failing grade for that lab. Multiple offenses may cause for permanent removal from the LAB.

**Teacher:** Mr. Engelhardt - (708) 579 6434 (Ext. 6434) [Jengelhardt@lths.net](mailto:Jengelhardt@lths.net)

**Division Chair/Assistant Division Chair**

Mr. Jason Hlavacs - TEL: SC (708) 579-7439 / NC (708) 579-6381 / FAX: (708) 579-6726

**Automotive Service & Diagnostics**

**Course Outline**

**Semester 1:**

**Unit 1: Safety**

* Safety forms glasses
* Hoisting / Lift Lab
* Safety video
* Safety test
* Book Work - Chapters 6, 7, & 11
* ***Job Sheets***

***- 8: safety checklist***

***- 9: Fire Extinguisher***

***- 13: Power & Shop Equip Safety***

***- 15: Vehicle Hoisting***

**Unit 2: Tools**

* Review Tools
* Tools Game
* Tools Test
* Book Work - Chapters 9, & 10
* ***Job Sheets***

***- 12: Hand Tool Identification***

**Unit 3: Brakes**

* Brakes Power Point
* Vacuum Booster
* Brake Bleeding Demo / Lab
* Disc Brake Lathe Demo/Lab
* Drum Brake Lathe Demo/Lab
* Inertia, ABS
* **ASE Prep Test**
* Advanced Brakes Test
* Book Work - Chapters 93, & 104, 106
* ***Job Sheets***

***- 297: Brake Bleeding***

***- 285: Brake System Component Identification***

***- 286: Brake System Principles (Kinetic Energy)***

***- 316: Brake Rotor Service (Lathe)***

***- 317: Vacuum Power Brake Booster Test***

**Unit 4: Steering and Suspension**

* Steering & Suspension Power Point
* Principles & Components
* Front/Rear Suspension Service
* Steering linkage & Systems
* Wheel Alignment Principles
* McPherson Strut Lab
* Inspection Lab
* **ASE Prep Test**
* Steering & Suspension Test
* Book Work - Chapters 112, 113, 114, 117, & 119
* ***Job Sheets***

***- 354: Suspension & Steering Lubrication***

***- 343: Suspension Inspection / Component Replacement***

***- 346: Macpherson Strut Service***

***- 360: Power Steering Fluid***

**Unit 5: Drivetrain**

* Drivetrain Power Point
* Clutches
* Manual Transaxle/Transmission
* Differentials
* Service
* Drivetrain Test
* Book Work - Chapters 121, 122, 123, 125, & 129
* ***Job Sheets***

***- 407: Differential Assembly Inspection***

***- 428: Service Automatic Transmission/Transaxle***

***- 437: Replace Trans Pan Seal/Gasket***

***- 459: Continuously Variable Transmission***

**Unit 6: Starting/Charging**

* Starting/Charging Power Point
* Battery Testing & Service
* Battery Lab
* Cranking System
* Charging System
* Starting/Charging Test
* Book Work - Chapters 39, 40, 51, 52, 54
* ***Job Sheets***

***- 119-129: Electrical Fundamentals & Circuit Worksheets***

***- 146: Battery Specifications***

***- 147: Key off Battery Drain Test***

***- 166: Charging System Output Test (Subwoofer Day)***

***- 183 Radio Diagnostics (Fuse)***

***- 231: Ignition Inspection and Testing***

***- 231: Spark Plug Inspection***

**Final Exam**

**Semester 2:**

**Unit 7: OBDII / Diagnostics**

* OBDII / Diagnostics Power Point
* Scan Tools
* Pulling a Check Engine Light Code
* Cylinder Balance Test Lab
* Compression Test Lab
* Multimeter Lab (Subwoofer Day)
* OBDII / Diagnostics Test
* Book Work - Chapters TBD
* ***Job Sheets***

***- 131: Test Light Usage***

***- 138: Solder Wire Repair (Create Fused Jumper Wire Lab)***

***- 132: Fused Jumper Wire in Use***

***- 71: Cylinder Power Balance Tests***

***- 72: Compression Testing***

***- 250: Scan Tool Diagnostics***

***- 238: Temperature Sensor Scan Tool Diagnosis***

***- 256: Exhaust Gas Analysis***

***- 272: OBD II Connector Identification***

***- 273: Retrieving OBD II Diagnostic Trouble Codes***

***- 274: OBD II Monitor Status***

**Unit 8: Engines**

* Engines Power Point
* 4 Stroke Theory
* 4 Stroke Parts
* Measuring
* Engines Test
* Book Work - Chapters 18, 24, 26, 28, 32, 33, 34, 35, 37
* ***Job Sheets***

**Then:**

Students will split up into 2 groups of equal numbers for units 9 and 10. These last 2 units will take up the last 12 weeks of class. Each group will be assigned a project listed below. After a given amount of time groups will be switched and the next project will start. There will be a total of 2 rotations during second semester.

**Unit 9: Live Technician**

* Students will have the chance to work on a daily basis in the lab on their own, staff, or parent’s cars. Each day will consist of live work and groups will be split up into different responsibilities/job roles; (Service managers, Tool managers and Technicians) each day the job roles will rotate allowing each student to experience each job title.
* Live lab work 5 days a week. You need to complete 10/10 Job sheets at a minimum
* Job Sheets
* - 150: Service and Replace a Battery

- 50: Accessory Drive belt Replacement

- 51: Radiator and Heater Hose Replacement

- 52: Thermostat Replacement

- 53: Radiator Replacement

- 75: Water Pump Replacement

- 116: Valve Cover Gasket Replacement

- 160: Remove and Replace the Starter Motor

- 168: Remove and Install Alternator

- 178: Door Panel Removal/Replacement

**Unit 10: Engine Teardown & Rebuild**

* Engine Tear Down DVD (4 Days)
* Students will completely disassemble an automotive engine down to the bare crank. After measuring and inspecting the vehicles engine it will then be 100% reassembled and checked for correctness.
* Job Sheets

- 16: Micrometer

- 17: Vernier Dial Caliper

- 18: Feeler Gauge

- 19: Straight Edge

- 85: Cylinder Head Flatness Measurement

- 20: Dial Indicator

- 21: Telescopic Gauge

- 79: Remove Cylinder Heads and Inspect

- 80: Engine Disassembly

- 81: Cylinder Wall Inspection

- 82: Block Thread Inspection & Correction

- 39: General Engine Identification

- 100: Connecting Rod Spec./Meas.

- 102: Piston Inspection and Measurement

- 104: Piston Rings

- 106: Engine Block Inspection

- 108: Cylinder Bore Deglazing

- 110: Piston-to-Bore Clearance

- 112: Crankshaft Inspection

**Final Exam**

Classroom Management Plan Mr. Engelhardt LTCC 2015-16

**My classroom Philosophy:**

**Act like an adult and you will be treated like one!** I believe, as a teacher my responsibility is to provide my students with a safely monitored and controlled classroom.  Effective classroom management starts with cooperation and understanding from my students.

**Expectations/Policies/Rules/Boundaries:**

1. When I’m talking…. you’re not
2. When someone else is talking……
3. Safety (Safety glasses, No Horseplay)
4. Respect (Yourself, Each Other, Rules, tools, etc.)
5. Honesty will take you far in my classroom (don’t lose my trust…)
6. Be on time to class
7. Bring appropriate materials to class daily (Pen, Pencil, Paper, Notepad, etc.)
8. French ***WILL NOT*** be tolerated
9. You can and may plead your case
10. Allaccidents should be reported to the teacher immediately
11. Each student will receive 3 hall visits per semester
12. Truancy does ***NOT*** give you another day to complete an assignment!
13. Any items considered a weapon or a potential personal safety risk for you or other students will be confiscated and the student will be immediately transported to the office where proper punishment will be issued. (Knife, Lighters, BB Gun, Drugs, Etc.)
14. I will ONLY respond to emails sent from your LTHS account. Other addresses will get no response.
15. All assignments are due on the specified due date. **15%** of final grade will be issued for every day late up till 3 days. After 3 days the assignment will no longer be accepted.
16. The final bell signifies class is over… NOT you’re dismissed, please wait to be dismissed.

**Consequences:**

1. Verbal warning
2. Loss of points & (1 on 1)
3. Students teacher conference
4. Detention
5. Call to request home intervention
6. Referral to administration

MY GOAL IS **NOT** TO SEND YOU TO THE OFFICE…

YOU ARE ADULTS….

ACT LIKE ONE…

**Promoting Motivation:**

* If my students act like adults they will be treated like adults. This results in complete respect via teacher/student. This creates a positive learning environment where students can thoroughly enjoy and absorb everything this class has to offer. Negativity is frowned upon and creativity is encouraged! “**Making Mistakes & Understanding them is the Key to Learning”**

**Classroom Setting:**

- Students anticipate coming to class because of the highly adult structured classroom environment. “***Freedom*** and ***Responsibility*** are one of the same”

- Clean, Organized, Safe, **FUN,** Laid Back, Work Friendly Environment

- Classroom is clearly split into 2 sections. (Classroom & Lab)

- **No students!** outside the auto’s program are allowed in the lab portion of the classroom at any time without my permission and will be accompanied by myself or another auto’s student at all times.

- **Additional Help?**

**Parental Involvement:**

* Students will have this Classroom Management Plan signed by their legal guardian and returned by the date specified.
* Parents will be involved for both positive and negative student behavior. It is my goal that parents are fully involved and aware of their students’ progress in my classroom.

**Vision:**

* A typical/Ideal day in my classroom entails seeing my students explore their creative and experimental side. The classroom is respectful, managed, organized, and is involved in the curriculum/assignments for that day. Students are having fun, questions are being asked, in depth learning is taking place, and my students can take home valuable and useful information that can be used in their everyday life.

If you put forth an honest effort, We will have a great semester!

Cleaning / Open Labs – (Job Sheet) Signatures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Make/  Model | Job Description | Did you feel today went well and why? | Was job area clean? Mr. E. Signature |
|  |  |  |  |  |
|  |  |  |  |  |
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|  |  |  |  |  |

**Safety and Lab Work Form**

**Owner: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Make: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Model: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**VIN: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Mileage: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Year: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Engine Size: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Color: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Job Description: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**(Was / Now) (Was / Now)**

**Tires: F/D Cond. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ F/P Cond. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PSI: \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ PSI: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_**

**R/D Cond. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ R/P Cond. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PSI: \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ PSI: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_**

**Air Filter: OK Replace Next Visit Needs Replacement**

**Belts: OK Glazing / Cracks / Loose Needs Replacement**

**Hoses: OK Bulging / Brittle / Leaking Needs Replacement**

**Coolant: OK Brown/Milky/Chunky Needs Replacement**

**Transmission Fluid: OK Filled $ 7.00 Per Quart? \_\_\_\_\_\_**

**Oil: OK Filled $4.00 / $7.00 x \_\_\_\_ qts = $\_\_\_\_\_\_\_**

**Brake Fluid: OK Filled / $2.00 BF Flush Recommended**

**Power Steering: OK Filled / $2.00 PS Flush Recommended**

**Windshield Wipers: OK Brittle / Dirty / Smudge Needs Replacement**

**Windshield Solution: OK Filled / $2.00**

**Running/Turn/Brakes Lights OK Burnt Out Which One(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Brakes: Rotors: (F) \_\_\_\_\_\_\_\_\_(R) \_\_\_\_\_\_\_\_\_\_Pad Life (% remaining) (F) \_\_\_\_\_\_\_% (R) \_\_\_\_\_\_\_%**

**Special Write-Up: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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Vehicle Work cannot be warranted and LTHS has the right to hold car if it unsafe to drive. There is also no guarantee that the car will be done by the end of the day. In other words if it is a students car and it is un drivable they must have planned alternate means of transportation ahead of time. Parts and disposal fees will be charged to the owner of the car. If the amount due has not been paid the vehicle will not be released.

Release of Liability:

With intending to be legally bound hereby, the undersigned agrees and does hereby release from liability and to indemnify and hold harmless Lyons Township High School District #204, and any of its employees/students, and Board of Education as regards to automotive class. This release is for any and all liability for personal injuries (including death) and property losses or damage occasioned by, or in connection with any activity or accommodations for this class. The undersigned further agrees to abide by all the rules and regulations promulgated by Lyons Township High School and/or its staff/students throughout the time the vehicle is in this class.

**Registered Owner \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_**

***Contact Information: Phone # or (EXT): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

*Labor Cost: $\_\_\_\_\_\_\_\_\_\_*

**(Group/s)** *Parts Cost: $\_\_\_\_\_\_\_\_\_\_*

**Work Done By: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *Total Amount Due:* $\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**(***Bill to be paid at LTHS North Book Store)*

***LTHS Thanks You For Your Support & Business!***

**Class Groups**

**Period: \_\_\_\_\_\_**

**Group #1 Group #2 Group #3**

**1.\_\_\_\_\_\_\_\_ 1.\_\_\_\_\_\_\_\_ 1.\_\_\_\_\_\_\_\_**

**2.\_\_\_\_\_\_\_\_ 2.\_\_\_\_\_\_\_\_ 2.\_\_\_\_\_\_\_\_**

**3.\_\_\_\_\_\_\_\_ 3.\_\_\_\_\_\_\_\_ 3.\_\_\_\_\_\_\_\_**

**4.\_\_\_\_\_\_\_\_ 4.\_\_\_\_\_\_\_\_ 4.\_\_\_\_\_\_\_\_**

**Group #4 Group #5 Group #6**

**1.\_\_\_\_\_\_\_\_ 1.\_\_\_\_\_\_\_\_ 1.\_\_\_\_\_\_\_\_**

**2.\_\_\_\_\_\_\_\_ 2.\_\_\_\_\_\_\_\_ 2.\_\_\_\_\_\_\_\_**

**3.\_\_\_\_\_\_\_\_ 3.\_\_\_\_\_\_\_\_ 3.\_\_\_\_\_\_\_\_**

**4.\_\_\_\_\_\_\_\_ 4.\_\_\_\_\_\_\_\_ 4.\_\_\_\_\_\_\_\_**

**Rotations: (Technicians =T, Shop Manager= SM, Tool Manager= TM)**

**#1- [T-1,2, TM-3 SM-4] #2- [T-2,3, TM-4 SM-1]**

**#3- [T-3,4, TM-1 SM-2] #4- [T-4,1, TM-2 SM-3]**

**AFTER ROTATION #4, IT STARTS ALL OVER AGAIN**

LTHS AutoShop *2015-16*

Bathroom/Locker Pass

Date:\_\_\_\_\_\_\_\_

LTHS AutoShop *2015-16*

Bathroom/Locker Pass

Date:\_\_\_\_\_\_\_\_

LTHS AutoShop *2015-16*

Bathroom/Locker Pass

Date:\_\_\_\_\_\_\_\_