



## Course Information

Course:	AST 2
Year:	2023-24
Instructor Information:	Robert M. Turner
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Office Hours:	7:00 am-2:30pm

## Course Material

James E. Duffy, Modern Automotive Technology 8<sup>th</sup> Edition Goodheart-Willcox Publisher 2014.  
ISBN 978-1-61960-370-7

Today's class online

## Course Description

In AST 2 the student will learn the following

### Brakes

- Principles of hydraulics
- Brake Fluid characteristics
- Drum brake systems
- Disc Brake systems
- Resurface drums / rotors
- Power brake assist systems
- Hydraulic control valves
- Emergency Brake designs
- Anti-Lock brake systems

### Suspension

- Suspension design, SLA, MacPherson Strut
- Front end geometry
- Wheel alignment
- Steering design – Rack & Pinion / Parallelogram
- Steering / suspension diagnosis
- Steering suspension repair
- Supplemental Restraint Systems

## **Automatic Transmission**

- Torque converter operation
- Power flow
- Clutch packs / roller clutches / Planetary gear sets
- Basic leak detection

## **Engine Performance**

- Computer System Controls
- Wiring Schematics
- DTC Analysis / Diagnostics
- Scan – tool data
- Emission Control, (HC,CO,CO2,NOx,O2)
- Ignition System Design
- Fuel Systems
- Fuel Trim

## **HVAC**

- Refrigerant / CFC License
- A/C operation
- A/C diagnosis
- Evacuate and Recharge A/C system
- Replace A/C components
- Install Refrigerant oil
- Performance test A/C systems

## **Policies**

See the Lewis and Clark Student Handbook for specific details.

## **Grade Breakdown**

See the Lewis and Clark Student Handbook for specific details.

We grade on three areas

1. Shop jobs            50%
2. Class Work           25%
3. Employability        25%

## **Attendance**

See the Lewis and Clark Student Handbook for specific details.

## Classroom Expectations

1. **Keep your cell phones in your pocket/assigned locker or it will be kept on my desk or in the office with Dr. Stewart if you cannot keep the cell phone use under control.**
2. No feet on the desk chairs, or computer.
3. Do not talk while I am lecturing.
4. Treat others with respect.
5. Keep your hands and feet to yourself.
6. Do not ask me to work on your car if your shop jobs are not caught up.
7. Do your own work.
8. If you make a mess clean it up.
9. If you miss a day it is your responsibility to ask for the make up work of what you missed in class or shop.
10. You will dress out each day when in the shop and have your safety glasses.

## Employability

Employability in AST 2 is graded in the following five categories:

1. **Punctuality:** If the student is on time to class and going to and from break, and beginning work in the shop and class in an appropriate manner they will not be deducted any of their points for the day
2. **Participation:** If the student does not participate in classroom activities, shop activities, sleeping in class, assignments not completed in a given amount of time, talking when the instructor is talking, **USING A CELL PHONE IN CLASS OR SHOP**, points will be deducted.
3. **Preparedness:** If the student does not bring a pencil or pen, notebook, shop clothes on a shop day, class work not completed on time, and safety glasses points will be deducted.
4. **Attitude:** If the student is not following instructions in the classroom, shop, is being rude, or smarting off to any adult points will be deducted.
5. **Attendance:** If you are absent you will lose all of your points for the day even if you have a doctor's note, if you are tardy you will lose ten of your twenty points for the day.

Each of the above offenses will be a deduction of five points per infraction with a max of twenty points lost for the day. The only offenses that will result in total loss of points for the day in one infraction are the following **CELL PHONE, ABSENTS, NO SAFETY GLASSES, NOT HAVING CLASS WORK COMPLETED ON TIME, AND NOT DRESSED OUT ON SHOP DAYS.**

Employability is worth 20% of your grade and is an easy twenty points to earn as long as you are willing to pay attention and do what is expected of you.

## Shop Job Policy

1. Fill out the year make and model of vehicle you are working on.
2. Put your name on the job sheet as well as the date.
3. Fender covers are issued at the beginning of the year, use them or you will lose hours on your shop job.
4. Use all data to look up information on the job before you start and staple it to your job sheet, your instructor is not your personal all data and will not earn you points to graduate.
5. Fill out the job sheet entirely.
6. Make sure your instructor signs off on the job sheet and dates it or you will lose credit for the sheet.
7. Keep track of your book and paper work if I find them lying around the shop I will recycle them.
8. Do not copy your neighbor's job sheet he might be wrong and that is considered cheating which results in no credit for the shop job.

## Shop Job Grading Breakdown

- |                                      |     |
|--------------------------------------|-----|
| 1. Name Date                         | 10% |
| 2. Year Make and Model               | 10% |
| 3. Fender cover and safety equipment | 10% |
| 4. Looking up Procedure on all data  | 20% |
| 5. Job sheet filled out properly     | 10% |
| 6. Instructor signature              | 30% |
| 7. Clean up your mess and tools      | 10% |

Total for following all steps

100% on shop job

## Student Workload Table

Category	Reading	Homework	Lecture & Discussion	Quiz/ Test	Exam	Projects	Total
Instructor Led Lecture & Discussion			245				245 hr
Lab						245	245 hr
Out-of-class participation by student							

## Automotive Shop Policies

1. All rules and regulations in the student handbook are in effect.
2. Everyone must wear clear ANSI approved safety glasses with side shields in the shop at all times. State law concerning the use of safety glasses in the shop will be strictly enforced.
3. Report all accidents and injuries to the Instructor immediately.
4. Students must inform their current Instructor before leaving the shop area.
5. Trash and fluid spills will be cleaned up immediately and in accordance with all DNR rules and regulations.
6. No one will sit, lean or lay on tables, tool boxes, floor, equipment, tires or vehicles.
7. Tools lost or broken by careless use will be charged to the student responsible.
8. Prior to performing any repairs on outside or personal vehicles, a student must receive approval from his/her Instructor.
9. Instructors will inspect vehicles prior to them leaving the shop area and will perform all test drives to verify repairs. Any vehicle deemed unsafe will not be allowed to leave the shop without a signed release waiver.
10. All work will be performed in a professional manner:
  - a. Cars driven safely
  - b. Safety stands used at all times
  - c. Fender covers used at all times
  - d. Creepers used and stored properly
11. Use of cell phones is strictly prohibited in classroom or shop.

## Course Outline of AST 2 Job/NATEF task list

### Brakes First Quarter

Description	Hours	Natef Task #
Service a Master Cyl	2.0	Vb4,9, 12
Service Drum Brakes	3.0	Va2,4/Vc2,4,5,6
Service Disc Brakes	2.5	Va2,4,Vd2,3,4,5,6,7, 10,11,12
Machine Brake Rotor	2.0	Vd8,9
Machine Brake Drum	2.0	Vc3
Bleed BrakeSystem	1.5	Vb9,12,13
Replace / duplicate lines/hoses	2.0	Vb7,8,10,11
Hydraulic. Valve	2.0	vb.1,5,6,10,11

Service Parking Brake	2.0	vf.3,4
Inspect, replace wheel studs	1.0	vf.7
Diag Brake System	4.5	Va1,2,3/Vb1,2,3,6/ Vc1,2/vd1,2/
Service P/Brake System	1.5	Ve1,2,3,4,5
ID / Inspect ABS	1.5	Vg1,2,
Service wheel bearings	2.5	Vf 1,2,6,8

### Steering and Suspension Second Quarter

Description	Hours	Natef Task #
Inspect whls/tires	2.0	lvf1,2,4,8
Wheel alignment	4.0	lve1,2,3,4,5,6,7,8,9 /lvf2,5
Inspect / replace Shock Absorbors	2.0	lvd1
Replace Stab. Bars/bushings	1.5	lvc 4,9,11,
R&R steering linkage	1.5	lvb16,17
R&R Inner tie rod	2.0	lvb7,8,17
Test P/S system/ R&R pump assem.	4.0	lvb4,5,9,10,11,12,13,14,15,19
R&R rear coil springs	2.0	lvc7
Replace Mcpherson Strut	3.0	lvc10
Dis/enable SIR	1.0	Vih5/IVB1,2
Diag SIR	1.0	Vih4
Diag. Body Elec.	2.0	Vih9/viib1
Diag. Stg / Susp. problems	3.0	lva1/ive2/lvc1,2,3,4,5,6,7,8,9,10,11,12-lvd1,3/lvb15,16,17

Service tapered Wheel Brg.	1.0	IV D 2
Inspect Steering Col	1.5	Ivb3,6,18
Service Stg. Col.	2.5	Ivb1,2,6,18

### Engine Performance Third Quarter

Description	Hours	Natef Task #
Service Elec. Components	2.5	Iib3/
Use scan tool /retrieve DTC's	1.5	Via9/viib1/viib2
Diag Engine Perf Problems	4.0	Via2/viib2/viib3/viid1
Test fuel (gas)Quality	1.0	VIIId1
Inspect/service TB	1.5	VIIId6
Check ISC/IAC	1.5	VIIId7
Test/service EGR	2.0	VIIIe3,4
Test Service AIR	2.5	VIIIe5
Test PCV / EVAP	3.0	VIIIe1,2/viii2/
Test injector waveform	2.0	VIIIA9/VIIIB3/VIIID6

### HVAC Auto Trans Fourth Quarter

Description	Hours	Natef Task #
CFC License	4.0	VIIIE 1,3
Recover/evac/recharge	2.5	VIIIE 1,2,3,4

R&R A/C components	4.0	VIIb6,8,9,11
Inspect/repair air handling Components	2.0	VIID1,6
Diagnose A/C system	4.0	VIIA 1,2,3,4,5,6/VIIB 1,2,4,6,7,10/VIID 1,2,7
Diag. Htg./A/C Controls	3.0	VIIA 3,5/ VIID 3,4,5,8
Torque Converter	1.0	AST-II-A-6, AST-II-A-7
Trans/Eng Perf Prob.	1.5	AST-II-A-1:
Trans Inspection	1.0	AST-II-B-1,AST-II-B-2
Diag Trans Press Prob.	1.5	AST-II-A-8, AST-II-A-9
Trans Elect Diagnosis	2.0	AST-II-A-10, AST-II-A 11, AST-II-B-3
Cooler/Line Inspection	1.0	AST-II-C-2

### Additional Tasks

SP2	Mechanical and Pollution safety	In Class
Lift it Right	Lift Safety Training	In Class
ASE Testing	Pre and post testing	In Class
Refrigerant Quiz	HVAC Refrigerant handling quiz	In Class
OSHA Training	In house OSHA safety training	In Class



## **Student Supplies**

1. Shop Uniform (Blue)
2. Work boots
3. One pair of safety glasses will be supplied however if you lose them you will purchase the next pair yourself.

**Parent/Guardian Signature:** \_\_\_\_\_

**Student Signature:** \_\_\_\_\_

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

**Signing and returning this Syllabus signature page as well as the student handbook is counted as a grade and must be returned before August 29 2018 to receive full credit for this assignment. If it is not returned before then it will result in a zero.**