

**NMSU-Grants Campus
Course Outline**

COURSE: OEAT 119- BASIC POWER TRAINS

INSTRUCTOR: Paul Garcia

PHONE: 287-7981 EXTENSION 115

CREDIT HOURS: 5 **ROOM:** 52

MEETS: For lecture and lab Mondays through Thursdays from 1:00-4:25 p.m.

TEXT: Automotive Technology, A systems Approach.

HOLIDAYS: Labor Day- Monday, September 4. Fall Break-Mon/Tues, October 9 and 10.

GRADING: 100-90 A
89-80 B
79-70 C
69-60 D
59 and below F
All homework assignments, labs, tests, quizzes, and work-sheets will be graded on the 0-100pt grading scale seen above. To find your current grade during the course of a semester average your current homework grade. Then average your current lab grade. Use the scale above to find your current grade in those areas. Then average your test/quiz grades and use the same scale to find your current grade in that area. These three grades will be averaged with your final test grade to determine your final grade for the semester using the scale above. Please remember that any work not turned in will be averaged in with the rest of the assignments with a grade of "0".

EVALUATION: TESTS/QUIZZES-WORTH 25% OF YOUR GRADE.
LABS//LAB WORK-WORTH 25% OF YOUR GRADE.
ATTENDANCE/HOMEWORK-WORTH 25% OF YOUR GRADE.
FINAL-WORTH 25% OF YOUR GRADE.

MAKE UP: Make up assignments and tests for times missed will be at the instructors convenience and will not necessarily be exactly what was missed. Also, it is the students' responsibility to obtain work that was missed.

ATTENDANCE: If you are absent more than three times, excused or otherwise, the instructor has the option of dropping your semester grade by one letter grade for every three absences. Three tardies count for one absence.

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COURSE TITLE: OEAT 119-BASIC POWER TRAINS

OVERVIEW: This course is designed to give the student a thorough understanding of basic power train systems in modern automobiles. Each component of the drive train will be covered which will include CV joints, differentials, clutches, u-joints, manual transmissions, transfer cases, locking hubs, and drivelines. These components will be studied as to design, function, diagnosis, and repair. Various components will be removed, repaired, and replaced. This course is designed using the ASE Manual Transmission and Transaxle task list. All safety precautions will be followed.

OBJECTIVES: Students will be given several opportunities for learning including:

- * add upon knowledge learned in previous classes during laboratory and homework assignments.
- * improve written and oral communication skills through classroom assignments, work orders, laboratory assignments, and peer teaching.
- * gain knowledge about the automotive powertrain through required readings, classroom lecture and classroom activities.
- * gain knowledge used to repair problems in drive train components.
- * gain knowledge in upkeep and maintenance of drive train components.
- * analyze problems to properly diagnose and troubleshoot drive train components.

EXPECTATIONS: So that the student gets as much as possible out of this class, the student is expected to:

- * Attend all class meetings. Learning opportunities are available in each and every class. Any class missed will put the student behind.
- * Be prepared for each class meeting by completing all homework on time. All lectures will be prepared with the assumption that all students have read the assignment and fully completed the homework.
- * Participate in class activities including lab work.
- * Complete all assignments thoroughly and on time.
- * Prepare for and take all exams.
- * Clarify definitions and concepts of items that are found unclear or confusing in class discussions, reading assignments and laboratory work.

In order to provide students with the learning opportunities of this course, the instructor is expected to:

- * Be on time and prepared for every class meeting.
- * Facilitate lectures and class discussions that lead to student understanding of course material.
- * Provide students with the opportunity to ask questions and have information clarified.
- * Be fair in all grading practices and treatment of students.
- * Be available to students outside of class time within reasonable limits.

EXPECTED OUTCOMES:

Upon successful completion of this course the student will be expected to be able to diagnose symptoms, test, and repair manual transmissions and drive trains. The student will also gain enough knowledge to pass the ASE

certification exam in Manual Transmissions and Drive Trains. Also, the student will be required to:

- ◆ Know gear design and operating principles.
- ◆ Have a thorough understanding of all drive train components
- ◆ Be able to identify and use special tools.
- ◆ Practice safety.
- ◆ Analyze and diagnose symptoms.
- ◆ Test manual transmissions and drive trains.

INSTRUCTIONAL ACTIVITIES:

The method of instruction will be primarily lecture and demonstrations. Slides, live action video and overhead transparencies will be used to clarify areas of study. Lab exercises will be assigned over each area covered with the hands-on portion performed to industry standards. All live work requires the use of work orders and all communication with the "customer" will be required to be logged.

NMSU-Grants Campus Schedule of Assignments

Schedule of Assignments:

- August 23 Introductions, syllabus and safety assignment. www.sp2.org
USERNAME=46490, PASSWORD=drain, PIN=initials+last four digits of your
social security number.
- August 24 Safety continued. Chapter 2 safety.
- August 28 Clutches, chapter 33 pages 843-846.
- August 29 Chapter 33 pages 847-850.
- August 30 Clutch service safety precautions. Chapter 33 pages 850-854.
- August 31 Clutch service. Chapter 33 pages 854-858.
- September 4 **LABOR DAY HOLIDAY**
- September 5 **Review questions pages 858-859 due. Test Chapter 33.**
- September 6 Chapter 34 manual transmissions and transaxles pages 860-863.
- September 7 Basic gear theory pages 863-866.
- September 11 Basic gear design continued...
- September 12 Transmission/Transaxle Design pages 866-871.
- September 13 Power flow pages 872-876.
- September 14 Electrical systems pages 876-879.
- September 18 **Review questions pages 879-880 due.**
- September 19 **Test Chapter 34.**
- September 20 Manual Transmission/Transaxle service pages 881-899.
- September 21 Continued....
- September 25 Continued...
- September 26 **Review questions Chapter 35 on pages 899-890 due.**
- September 27 **Test Chapter 35**
- September 28 Chapter 36-Drive axles and differentials, pages 901-904.

- October 2 CV-Joint service, pages 904-911.
October 3 Rear wheel drive shafts, pages 910-915
October 4 Differentials and drive axles, pages 915-922
October 5 Limited Slip differentials, pages 922-927.
- October 9 **FALL BREAK-NO CLASSES**
October 10 **FALL BREAK-NO CLASSES**
October 11 Servicing the final drive assembly, pages 927-933.
October 12 Review questions on pages 934-935 due.
- October 16 Prepare for final, remainder of labs due.
October 17 **Final test and clean-up.**

Statement of American's with disabilities act:

If you have, or think you may have, a disability that interferes with your performance as a student in this class, you are encouraged for academic reasons to discuss this on a confidential basis with your instructor and/or the American's with disabilities act (ADA) coordinator in the office of student services or at 287-7981.

This schedule may change at the instructor's discretion. All students will be notified of any changes.

CHAPTER 33 CLUTCHES

- 1 TROUBLESHOOT A CLUTCH ASSEMBLY
- 2 CLUTCH LINKAGE INSPECTION AND SERVICE
- 3 INSPECTING A HYDRAULIC CLUTCH LINKAGE
- 4 CLUTCH INSPECTION AND SERVICE
- 5 CLUTCH REMOVAL INSPECTION, AND INSTALLATION
- 6 REMOVE AND INSTALL A TRANSMISSION OR TRANSAXLE

CHAPTER 34 AND 35, MANUAL TRANSMISSIONS AND TRANSAXLE SERVICE

- 9 ROAD TEST A VEHICLE FOR TRANSMISSION PROBLEMS
- 11 CHECKING THE TRANSAXLE MOUNTS
- 17 CHECK FLUID IN A MANUAL TRANSMISSION AND TRANSAXLE
- 7 DISASSEMBLE AND REASSEMBLE A TYPICAL TRANSAXLE
- 8 INSPECT AND SERVICE AN EXTENSION HOUSING
- 15 SERVICING GEARS AND SYNCHRONIZERS
- 14 INSPECTING INTERNAL SHIFT MECHANISMS
- 10 INSPECT AND ADJUST SHIFT LINKAGE
- 13 SERVICING FWD FINAL DRIVES
- 12 SEALING A TRANSMISSION OR TRANSAXLE

CHAPTER 36, DRIVE AXLES AND DIFFERENTIALS

- 22 SERVICING OUTER AND INNER CV JOINTS
- 16 ROAD CHECK DIFFERENTIAL NOISES
- 19 DRIVE AXLE INSPECTION AND DIAGNOSIS
- 20 SERVICING U-JOINTS AND THE DRIVE SHAFT
- 23 SERVICING THE CENTER SUPPORT BEARING
- 24 DRIVE AXLE LEAK DIAGNOSIS
- 25 COMPANION FLANGE AND PINION SEAL SERVICE
- 26 MEASURE AND ADJUST PINION DEPTH, BEARING PRELOAD, AND BACKLASH
- 27 SERVICING THE RING AND PINION GEARS
- 28 DIFFERENTIAL CASE SERVICE
- 30 DIFFERENTIAL HOUSING SERVICE
- 32 AXLE SHAFT AND BEARING SERVICE

XTRA CREDIT

- 31 SERVICING LIMITED-SLIP DIFFERENTIALS
- 29 LIMITED-SLIP DIFFERENTIAL DIAGNOSTICS