



AUMT 2413 Automotive Drive Train and Axles

Course Syllabus: Fall 2013

"Northeast Texas Community College exists to provide responsible, exemplary learning opportunities."

Keith Fennimore

Office: CSA-IT-111

Phone: 903-434-8159

Email: kfennimore@ntcc.edu

Office Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Online
	1:00pm – 3:30pm	1:00pm – 3:30pm	1:00pm – 3:30pm	1:00pm – 3:30pm	None.	N/A

The information contained in this syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

Catalog Course Description:

AUMT 2413 - Automotive Drive Train and Axles I

4 credit hours.

Lecture/Lab/Clinical: Two hours of lecture and six hours of lab each week.

A study of automotive clutches, clutch operation devices, manual transmissions/transaxles, and differentials with emphasis on diagnosis and repair. Course material may be taught using manufacturer-specific information. Students enrolled in this course must lease a set of hand tools from the college for \$40 per semester.

Note: Additional course fee(s) required.

Required Textbook(s):

Today's Technician: Manual Transmissions and Transaxles, 5th Edition
includes Classroom Manual and Shop Manual

Jack Erjavec Columbus State Community College (Emeritus)

ISBN-10: 1435439333

ISBN-13: 9781435439337

668 Pages Paperback

Previous Editions: 2006, 2002, 1997

©2011 Published

Recommended Reading(s):

Student Learning Outcomes:

Utilize appropriate safety procedures; diagnose and repair drivelines, clutches, manual transmissions/transaxles, and differentials; and service constant velocity joints and universal joints.

Exemplary Educational Objectives:

N/A

SCANS Skills:

6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 8.1, 8.2, 8.3, 8.4

Evaluation/Grading Policy:

The Overall Achievement Grade is broken into the following areas and percentages.

Overall Achievement Grade:

- ✓ Theory Grade:
 - Final Exam – 15%
 - Mid-Term Exam – 10%
 - Quizzes – 5%
- ✓ Shop Grade:
 - Lab – 35%
 - Required Minimum
 - Total Labor Time
 - Safety
 - Daily or Weekly Work Ethics Grade – 20%
 - Worksheets – 15%

A=	Superior	(90-100)
B=	Above Average	(80-89)
C=	Average	(70-79)
D=	Below Average	(60-69)
F=	Failing	(59-00)

Note: A “C” or better is required in your declared major.

Note: The Work Ethics grade is based on the characteristics listed below under Professionalism. The instructor may grade on a weekly or daily basis depending on their preference. If you are absent you will receive a zero for the day.

Note: The following things will result in a zero for the day.

- **Not properly dressed.**
- **No safety glasses.**
- **Sleeping during class or lab.**
- **Using cell phones/texting during class or lab.**

Lectures & Discussions, Tests/Exams and Assignments:

Unit I Introduction To Manual Drive Train And Axle Design

Lesson 1: Manual Drive Train And Axle Design

AS1-L1-UI Manual Drive Train Designs
Unit I Test

Unit II Manual Transmission Components And Operation

Lesson 1: Manual Transmission Gear Components And Operation

AS1-L1-UII Manual Drive Train Operation

Lesson 2: Manual Transmission Design And Operation

AS1-L2-UII Manual Drive Train Design Principles

Unit II Test

Unit III Manual Transmission Diagnosis And Repair

Lesson 1: Diagnose And Performance Test A Manual Transmission

- JS1-L1-UIII Identify and Interpret Manual Drive Train Concerns
- JS2-L1-UIII Diagnose and Service Manual Drive Train Fluids
- JS3-L1-UIII Diagnose, Performance Test, and Determine Needed Repairs

Lesson 2: Remove, Disassemble, Inspect, And Clean A Manual Transmission

- JS1-L2-UIII Remove a Manual Transmission
- JS2-L2-UIII Disassemble, Clean, and Inspect Manual Transmission Components

Lesson 3: Reassemble And Reinstall A Manual Transmission

- JS1-L3-UIII Reassemble a Manual Transmission
- JS2-L3-UIII Reinstall and Adjust a Manual Transmission

Unit III Test

Unit IV Clutch Assembly Components And Operation

Lesson 1: Clutch Assembly Components And Operation

- AS1-L1-UIV Clutch Assembly Components and Operation

Unit IV Test

Unit V Clutch Assembly, Diagnosis, And Repair

Lesson 1: Clutch Assembly Diagnosis

- JS1-L1-UV Diagnose and Performance Test a Clutch Assembly

Lesson 2: Clutch Assembly Repair

- JS1-L2-UV Inspect and Replace a Clutch Assembly
- JS2-L2-UV Inspect Clutch Pedal, Linkage, and Hydraulic Components
- JS3-L2-UV Bleed a Hydraulic Clutch Assembly

Unit V Test

Unit VI Drive Shaft Diagnosis And Repair

Lesson 1: Drive Shaft Components

- AS1-L1-UVI Drive Shaft Components

Lesson 2: Drive Shaft Diagnosis And Removal

- AS1-L2-UVI Diagnose and Remove Drive Shaft

Lesson 3: Drive Shaft Inspection And Repair

- JS1-L3-UVI Diagnose and Service a Drive Shaft

Unit VI Test

Unit VII Differential Components And Operation

Lesson 1: Differential Component Design

- AS1-L1-UVII Differential Operation
- JS1-L1-UVII Service a Limited-Slip Differential

Unit VII Test

Unit VIII Differential Diagnosis And Removal

Lesson 1: Differential Diagnosis

- JS1-L1-UVIII Diagnose the Differential Assembly
- JS2-L1-UVIII Diagnose and Inspect Drive Axles

Lesson 2: Differential Repair

JS1-L2-UVIII Service Axle Shaft and Bearings
Unit VIII Test

Unit IX Differential Repair, Installation, And Performance Test

Lesson 1: Differential Disassembly, Clean And Inspect

AS1-L1-UIX Differential Disassembly

Lesson 2: Differential Assembly, Adjustment, Installation, And Performance Test

JS1-L2-UIX Service a Differential
Unit IX Test

Unit X Manual Transaxle Operation And Diagnosis

Lesson 1: Manual Transaxle Operation

JS1-L1-UX Service Transmission/Transaxle Sensors, Drives and Switches

Lesson 2: Manual Transaxle Diagnosis

JS1-L2-UX Diagnose, Performance Test, and Determine Needed Repairs for a Manual Transaxle
Unit X Test

Unit XI Manual Transaxle Repair, Installation, And Performance Test

Lesson 1: Transaxle Removal And Disassembly

JS1-L1-UXI Remove a Manual Transaxle

Lesson 2: Clean, Inspect, And Transaxle Assembly

JS1-L2-UXI Disassemble, Clean, and Inspect Manual Transaxle Components
JS2-L2-UXI Reassemble a Manual Transaxle
JS3-L2-UXI Diagnose Transaxle Final Drive 361-364 W 77-80
JS4-L2-UXI Diagnose Half Shaft and CV-Joint Concerns
JS5-L2-UXI Service Front-Wheel-Drive Front Wheel Bearings
JS6-L2-UXI Service Half Shaft and CV-Joint

Lesson 3: Transaxle Installation And Performance Test

JS1-L3-UXI Reinstall and Adjust a Manual Transaxle
JS2-L3-UXI Remove and Replace Transaxle Final Drive
JS3-L3-UXI Service Transaxle Final Drive Assembly
Unit XI Test

Unit XII Four-Wheel-Drive Operation, Diagnosis, And Repair

Lesson 1: Four-Wheel-Drive Components And Operation

AS1-L1-UXII Four-Wheel-Drive Components & Operation

Lesson 2: Four-Wheel-Drive Diagnosis And Repair

JS1-L2-UXII Diagnose Four-Wheel/All-Wheel Drive Systems
JS2-L2-UXII Service Front-Wheel Bearings and Locking Hubs
JS3-L2-UXII Service Four-Wheel/All-Wheel Drive Seals, Vents, and Lube
JS4-L2-UXII Diagnose Electrical/Electronic Components in Four-Wheel/All-Wheel Drive Systems
Unit XII Test

Unit XIII Transfer Case Diagnosis And Repair

Lesson 1: Transfer Case Components And Operation

AS1-L1-UXIII Transfer Case Components and Operation

Lesson 2: Transfer Case Diagnosis And Removal

AS1-L2-UXIII Transfer Case Diagnosis and Removal

Lesson 3: Disassemble, Clean, Adjust, And Reassemble A Transfer Case

AS1-L3-UXIII Disassemble, Adjust, and Reassemble a Transfer Case

Lesson 4: Transfer Case Installation And Performance Test

JS1-L4-UXIII Service a Transfer Case

JS2-L4-UXIII Inspect and Service a Transfer Case Shift Controls

Unit XIII Test

Mid-Term

Final

Other Course Requirements:

Type or insert other important components of your syllabus here: For example: Supplies or Calendar

Student Responsibilities/Expectations:

Attendance Policy

Regular and punctual attendance at all scheduled classes is expected. Attendance is necessary for successful completion of course work. If you are absent, you are responsible for initiating procedures for make-up work. All course work missed, regardless of cause, is to be completed to the satisfaction of the instructor. Please see the schedule of classes for the last day to withdraw. Religious Holy Days: please refer to the current Northeast Texas Community College Student Handbook

The Carroll Shelby Automotive Program has 90% required attendance policy for all courses! After exceeding the allowed absences you will receive either an F or Incomplete for the course. It is up to you to initiate a drop in the Office of Admissions and Records. (At the discretion of the instructor, a student with no more than one absence and with an "A" average will be exempt from the final exam.)

Note: Coming to class late three times will be considered an absent.

Professionalism

The Mechanical Power Technology program, like most other vocational programs, has policies that must be followed. These policies will give you, the student, a better opportunity to learn the mechanical power trade. *The general classroom and lab policies are listed in this syllabus and are to be abided by.* The instructor may have additional policies for their class. If required the instructor will choose partners for assignments as required.

General Safety Rules

The instructor may have additional safety policies for their class.

1. Make sure all hand tools are in good condition. Using a damaged hand tool or the incorrect tool for the job may result in injury.
2. When lifting a car by using a jack, always make sure the jack is centered. When the vehicle is raised always use safety jack stands. Never go under a car without safety jack stands.
3. Never wear jewelry such as rings, bracelets, necklaces, watches, or ear rings when working on a car.
4. Long hair should be tied back.
5. Never use compressed air to remove dirt from your clothing. Also, never spin bearings with compressed air.
6. When using any machines, such as presses, hoists, drill presses, or special equipment, make absolutely certain that all operational procedures are followed and all safety tests have been passed.
7. Always wear safety glasses in shop areas.
8. Always use exhaust fans/evacuation system when running a car in the shop.
9. Use proper lifting procedures when lifting heavy objects.
10. Make sure you know the shop layout.
 - a. Fire extinguisher locations
 - b. Emergency fire exits
 - c. Eyewash station
 - d. First-aid kit
 - e. Fire blanket
11. Dispose of all hazardous waste in appropriate containers.
12. Horseplay physical or verbal is not allowed at any time. **THINK BEFORE YOU ACT!**
13. Report all injuries to the Instructor immediately.
14. Wear proper work clothes in the shop area. (See: Dress Code.)
15. Students are not permitted to use instructor's tools at any time.
16. Students are not permitted to enter any instructor's offices unless accompanied by an Automotive Technology faculty member. **NO EXCEPTIONS!**
17. Any personal emergencies will be handled through the switchboard and security.
18. Any printing must have the instructor's approval.

Good Housekeeping (Daily)

1. Clean up all spills immediately.
2. Make sure all tools and toolboxes are returned to their proper place.
3. Store oily rags in proper containers.
4. Clean all tools before returning to tool room or assigned toolbox.
5. Sweep shop areas after each class.
6. Clean all equipment after use.
7. Keep benches clean and free of trash.
8. Make sure tools are in proper working order. Report any broken tools to the instructor immediately.
9. Do not leave creepers and tools on floors unless in use.
10. Empty shop garbage cans.

Vehicle Rules

1. Do not sit on cars.
2. Do not sit in cars unless you need to be in the car.
3. When pushing cars always push from the back never from the side.
4. Always use floor mats and seat covers.
5. Always use fender covers when working under the hood.
6. When moving vehicle always make sure your hands, shoes and clothing are clean, in order to avoid getting the interior dirty.

7. Be sure to clean greasy handprints off fenders and hoods when work is completed.
8. Do not play car radios.
9. Do not write on dirty cars (i.e. Wash me)
10. Never ever mess with any car that comes into the shop.
11. Treat every vehicle better than you would treat your own.

Class Rules

1. When asking questions please raise your hand and wait to be called on.
2. Sunglasses may not be worn in class.
3. No aggressive body contact.
4. No cheating. Do your own work. See Cheating Policy
5. Food, Drink & Gum are not allowed during the instructional periods.
6. Profanity is not allowed.
7. All telephones, pagers and beepers are to be turned off before class and lab. If class is interrupted due to personal communication devices you will receive a 0 for the day.
8. The teacher is always right.
9. If the teacher is wrong refer to rule number 8.
10. If you have any problems ask to talk to the teacher in private and any problem can be worked out.
11. Smoking is allowed only in designated areas.
12. The Internet will be used only with the approval of the Mechanical Power Technology Faculty.

Live Work

1. All live work is at the discretion of the instructor and department chair.
2. All live work must have training value to the student and be part of or consistent with the requirements of the course of study.
3. No live work will be allowed unless student has completed related tasks or units.
4. All vehicles must have a signed work request completed, approved and filed in the office before any work may begin.
5. A copy of the work request will be left on the vehicle's dash while the vehicle is in the shop.
6. Students and outside customers are responsible for paying for any materials used in the repair of vehicles.
7. The student working on a vehicle will be responsible for making a bill of materials to be approved by the instructor.
8. All property belonging to students or customers to be worked on is brought into the school and left in the school at the owner's risk.

Code of Ethics

1. Treat people with respect.
2. Exhibit positive behavior.
3. Wear proper dress and exhibit a professional appearance.
4. Follow rules, regulations and policies as established.
5. Maintain regular attendance.
6. Assume responsibility for decisions and actions.
7. Demonstrate willingness to learn.
8. Practice time management.
9. Practice cost effectiveness.
10. Apply ethical reasoning.
11. Display initiative.
12. Display assertiveness.

13. Exhibit pride.
14. Exhibit the following characteristics:
 - a. Honesty
 - b. Reliability
 - c. Diligence
 - d. Enthusiasm
 - e. Cooperativeness
 - f. Loyalty

Dress Code

It is important to present a professional image in the work place. Uniform shirts are to be light blue work shirts (short or long sleeves) and work pants are to be navy blue in color (example - Dickie brand) and five (5) pair are recommended (minimum requirement of three pair). These are not available at the Campus Bookstore but can be purchased at most retail stores (i.e., Wal-Mart, K-mart, Sears, JC Penney). If your employer furnishes uniform shirts, they may be worn in place of the school shirt. These shirts should be tucked in, clean and neat at all times. You must have an approved uniform by the twelfth day of class. If you do not, you will have 10 points deducted from your professionalism grade each class period the shirt is not worn. Shorts and sandals are not allowed. *Professional appearance is part of your grade and is reflected in your work ethics grade.*

Safety Glasses

Safety glasses are required. Prescription glasses are okay if confirmed by a statement from your optometrist and are fitted with side shields. Bring this statement at the start of school.

Driver's License

Automotive students are required to have a valid driver's license. Without this students cannot drive vehicles to complete the required tasks. Students' are responsible for providing vehicles for many of the tasks they are required to complete.

Tools/Supplies

In addition to the regular college expenses, students entering the automotive trades programs must possess hand tools. The cost of tools and a roll cab for the freshman year is expensive investment depending on brand and place of purchase. For the second year, the costs are considerably less. It is recommended that all tools and equipment be insured under the parents' or the student's homeowner's insurance. NTCC is not responsible for students' tools. Some of the required supply items that students accepted into the automotive service technician program need to furnish are not on the equipment lists. These items, such as welding rods, brake fluid, oils, etc., must be of a particular type and should not be purchased prior to arrival on campus. Again, after arriving on campus, students will receive information about the identification and purchase/attainment from individual course instructors at an approximate cost of \$150 for the school year. See required tool list.

Vehicles for Task Completion

Students' are responsible for providing vehicles for many of the tasks they are required to complete. The school supplies certain lab units used in very specific tasks, but it is the student's responsibility to find the vehicles to complete their lab tasks. Student's may work on their own, family and friends vehicles, but remember that we are student and some projects take much more time than a professional shop. Also note that all outside work is at the discretion of the instructor. It is desirable, but not required to have a later (2000 or newer) model vehicle that can be left on campus to perform required occupational practices in labs. Students may exchange vehicles with other students when different years, makes, and models are necessary to complete tasks. It is not necessary that the vehicle be licensed or insured and there is parking provided for these vehicles.

Parts and Supplies

The Mechanical Power Technology Dept. does not purchase parts for projects. The owner is responsible for acquiring all parts and supplies required for the repair. There will be a shop service charge of five dollars (\$5.00) on each repair order. This is to cover hazardous waste disposal and consumable materials.

NTCC Academic Honesty Statement:

"Students are expected to complete course work in an honest manner, using their intellects and resources designated as allowable by the course instructor. Students are responsible for addressing questions about allowable resources with the course instructor. NTCC upholds the highest standards of academic integrity. This course will follow the NTCC Academic Honesty policy stated in the Student Handbook."

Academic Ethics:

The college expects all students to engage in academic pursuits in a manner that is beyond reproach. Students are expected to maintain complete honesty and integrity in their academic pursuit. Academic dishonesty such as cheating, plagiarism, and collusion is unacceptable and may result in disciplinary action. Refer to the student handbook for more information on this subject.

ADA Statement:

It is the policy of NTCC to provide reasonable accommodations for qualified individuals who are students with disabilities. This College will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to arrange an appointment with a College counselor to obtain a Request for Accommodations form. For more information, please refer to the NTCC Catalog or Student Handbook.

Family Educational Rights And Privacy Act (FERPA):

The Family Educational Rights and Privacy Act (FERPA) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's educational records. These rights transfer to the student when he or she attends a school beyond the high school level. Students to whom the rights have transferred are considered "eligible students." In essence, a parent has no legal right to obtain information concerning the child's college records without the written consent of the student. In compliance with FERPA, information classified as "directory information" may be released to the general public without the written consent of the student unless the student makes a request in writing. Directory information is defined as: the student's name, permanent address and/or local address, telephone listing, dates of attendance, most recent previous education

institution attended, other information including major, field of study, degrees, awards received, and participation in officially recognized activities/sports.

Other Course Policies: