AUT 141 ASEP - AUTO POWER TRAINS I (4 CR.)

Course Description

Presents operation, design, construction and repair of power train components, standard and automatic transmission. Includes clutches, propeller shaft, universal joints, rear axle assemblies, fluid couplings, torque converters as well as 2, 3, and 4 speed standard, overdrive and automatic transmissions. Part I of II. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose

This is the first course in a two-course study of automotive power trains. AUT 141 is a detailed study of manual transmissions, differentials, and manual transaxles, clutch systems, drive axle, CV joints, driveline and 4 wheel drive systems manual and automatic.

Course Prerequisites/Corequisites

The ability to read, write, and speak the English language.

Course Objectives

- Upon completion of this course the student should be able to:
- Explain the operation of, and perform service on, both standard and limited slip differentials
- Identify and perform service on both Cardin and constant velocity universal joints
- Explain both the operation and service of clutch systems used with manual transmissions and
- transaxles
- Explain the operation of manual transmissions and transaxles
- Disassemble, inspect, repair, and reassemble manual transmissions and transaxles
- Use available service information to locate specifications related to the inspection, repair and
- adjustments of automotive engines
- Demonstrate skills using inspection procedures, troubleshooting and making corrective repairs

Major Topics to be Included

- Differentials
- Drive line service
- Clutch systems
- Manual transmissions - principles of operation, diagnosis and service
- Manual transaxles - principles of operation, diagnosis and service
- Manual transmission and manual transaxles operation, diagnosis and service
- Drive axle and cv joints
- 4 wheel drive systems operation, diagnosis and service

INSTRUCTOR

Keith Brown
Bisdorf/ AA Bldg, Room 352
703.845.4623 (office)
703.845.6003 (fax)
703.618.6844 (cell)
Email: keibrown@nvcc.edu

Note: Instructor office hours are available at the administrative desk in the AA/Bisdorf Building, room 352, online at http://www.nvcc.edu/home/keibrown/, or by calling 703.845.6341

CLASS MEETING TIMES
Tuesdays from 9am to 3:00 pm in room AE107

COURSE TEXT
"Automotive Manual Drivetrain and Automatic Transmissions"
GM ASEP Automotive Curriculum Series
Pearson Publishing
ISBN#9780134161761

COURSE SCHEDULE OVERVIEW*

Course Schedule	Lecture Topics	Lab Activity
Week 1 (10/24/17)	Intro to Drive Trains(Ch.1) & Wheel Bearings and Service (Ch.9)	
Week 2 (10/31/17)	Clutch Parts, Operation, Diagnosis & Service (Ch.2&3)	Clutch Service-Trans R&R
Week 3 (11/7/17)	Manual Trans Parts and Operation (Ch. 4 &5)	Transmission Disassembly
Week 4 (11/14/17)	Manual Trans Diagnosis and Operation (Ch 6)	Transaxle Disassembly
Week 5 (11/21/17)	Driveshafts an CV Joints (Ch.7&8)	CV Joint & Drive Shaft Diag. & Service
Week 6 (11/28/17)	Drive Axles and Differentials (Ch. 10&11)	Differential Service & Repair
Week 7 (12/5/17)	Four Wheel Drive/AWD (Ch.13&14)	4WD/AWD Service & Repair
Week 8 (12/12/17)	Final Exam	

* Lecture topics and lab activities subject to change based on instructor discretion and class progress

TEXT CHAPTERS TO BE COVERED*

NOTE: This list is intended to give the student a *general* idea of the material to be covered in the class, not a list of assigned chapters. Topics and chapters covered subject to change based on instructor discretion and class progress. **Refer to BlackBoard for the most current schedule and assignments.**

- Chapter 1 "Introduction to Drivetrains"
- Chapter 2 "Clutch Parts and Operation"
- Chapter 3 "Clutch Diagnosis and Service"
- Chapter 4 "Manual Transmissions Parts and Operation"
- Chapter 5 "Manual Transaxle Parts and Operation"
- Chapter 6 "Manual Transmission/Transaxle Diagnosis and Service"
- Chapter 7 "Driveshafts and CV Joints"
- Chapter 8 "Drive Axle Shaft and CV Joint Service"
- Chapter 9 "Wheel Bearings and Service"
- Chapter 10 "Drive Axles and Differentials"
- Chapter 11 "Drive Axle and Differential Diagnosis and Service"
- Chapter 13 " Four-Wheel and All-Wheel Drive"
- Chapter 14 "Four-Wheel Drive Diagnosis and Service"

Subject to change based on instructor's discretion and course progress

GRADING

- Attendance-20%
- Class participation, laboratory performance-30%
- Class/laboratory conduct-10%
- Tests, quizzes, homework- 20%
- Final exam- 20%

Letter-grade equivalents: A = 91-100
B = 81-90
C = 71-80
D = 61-70
F = 60 and below

Student responsibilities and requirements:

- Attendance is mandatory! Unexcused absences will result in a reduced course grade or possible automatic withdrawal.
- Be punctual – all sessions are planned to start on time. 4 late arrivals equal 1 unexcused absence.
- Class is not over until you are dismissed by the instructor. Leaving early 4 times equals 1 unexcused absence and no credit for the lab.
- Students are required to conduct themselves in a professional manner. Respect the instructional staff, your fellow students, and yourself.
- All homework assignments and take home tests are due within **one week** from when they are given. Assignments turned in late will be subject to a 20% grade penalty.
- There will be required writing assignments in this course. These assignments may be typed or hand written.
- No assignments will be accepted after 2 weeks past due.
- Students will need internet access to use Blackboard for class assignments and other class related activities. The computer lab is available on campus if needed.
- Students are *required* to monitor and use their NVCC email accounts for all class activities. This is the email account the instructor will use to communicate with the students.
- GM ASEP students are required to complete General Motors specific online training as assigned by the instructor. Not doing so will result in a reduced course grade as well as no GM credit for the assigned training. A GM training ID and password will be assigned by your sponsoring dealership.
- Students are expected to bring pencils, pens, and notepaper to all class meetings.
- Students **must** purchase Scan Tron answer sheets for the midterm and final exams. These are available from the campus bookstore. Don't forget – get them ASAP!
- Students **must** use a No. 2 black pencil when taking any test requiring a Scan Tron form.
- Students must read, understand and adhere to the "Automotive Laboratory Rules" posted online on Blackboard.
- Students must sign and return the attached lab rules verification form before the first lab activity.
- Students are required to clean up laboratory areas used during class. This is to include returning all tools and equipment borrowed from the college. The college (and most repair shops) does not provide janitorial services in shop areas. Sufficient time will be given prior to the end of lab sessions for clean-up.
- All students and staff must wear industrial-quality eye protective devices in accordance with the Virginia Statute 22.1-275 while engaged in laboratory activities. Eyewear should conform to ANSI Z87.-2003 (Z87+) standards as designated on the lens and/or frame. **WARNING! Students will not be allowed access to any laboratory area without approved safety eyewear! DO NOT FORGET AS THIS WILL RESULT IN A REDUCED COURSE GRADE!!!**
- Lab contracts are to be signed by the student and approved by the instructor at the end of each lab session. It is imperative that the lab contract is kept up to date.
- Understand that your success in this course depends on your full participation.

ADDITIONAL INSTRUCTIONS AND INFORMATION

- **For college emergencies and closings, go to www.nvcc.edu and click on "Closings & Emergencies" at the bottom of the home page.**
- In the event of a late or delayed opening, if there is at least 45 minutes left in the class/lab session, the class will meet at the indicated campus opening time.
- The "Academic Calendar" can be accessed from the NOVA home page.
- Automotive safety information, such as safety procedures and MSDSs, are located in AE117/Tool Room.
- If you are seeking special accommodations based on a disability, you must provide an Accommodations Memorandum. This can be obtained from the Counselor for Special Needs, located in the Bisdorf/AA building, Room 229. The telephone number is 703.845.6301.
- Students should expect to spend a minimum of two hours per week outside of class for proper preparation and completion of homework. Your success in this course will largely depend on your desire and interest in the subject and the effort you are willing to put forth.
- Information on school closings and emergency procedures can be found at : www.nvcc.edu/emergency/
- Please feel free to discuss any concerns or problems regarding the course with the instructor. Your feedback is essential to the quality of this course.

ATTENDANCE AND GRADES (2nd 8 WEEK SESSION, FALL 2017)

- Session begins on **October 18**
- If you are not present for any class sessions by **October 24,** you will be automatically withdrawn by the instructor.
- The last day to drop the class with tuition refund is **October 24.**
- **November 27** is the last day to withdraw from the class without a grade penalty. The instructor may withdraw a student at this time if attendance is below 60%.
- Any student that wishes to change their enrollment status to audit must do so by **October 24,** pending instructor approval.
- Classes and Examinations end **December 17**

OTHER IMPORTANT DATES

- **November 22** Non –instructional day/no classes, College closes at noon
- **November 23-24** Thanksgiving Holiday for faculty, students, and staff, College offices closed
- **November 25-26** Non-instructional days/no classes
- **January 10** Spring 2018 semester begins *(All students must be registered for the Spring 2018 semester before this date. NO EXCEPTIONS!)*