

Odessa College
Technical Studies Division
Automotive Technology

Course Syllabus

COURSE NUMBER: AUMT 2425
COURSE TITLE: Automotive Automatic Transmission and Transaxle
CREDIT HOURS: 4 **LECTURE HOURS:** 2 **LAB HOURS:** 6
PREREQUISITE: Consent of department chair or instructor.

CATALOG DESCRIPTION:

A study of the operation, hydraulic principles, and related circuits of modern automatic transmissions and automatic transaxles. Diagnosis, disassembly, and assembly procedures with emphasis on the use of special tools and proper repair techniques. May be taught manufacturer specific. Lab fee required. (SCANS 1, 2, 3, 5, 6, 7, 8, 9, 10, 11) Prerequisite: Consent of department chair or instructor

COURSE LEARNING OUTCOMES:

Utilize appropriate safety procedures; perform general transmission and transaxle diagnosis; perform automatic transmission and transaxle maintenance and adjustments; and perform in-vehicle and off-vehicle automatic transmission and transaxle repair.

COMPETENCIES:

After completing this course, the student should be able to demonstrate automotive competency in:

II. AUTOMATIC TRANSMISSION/ TRANSAXLE

TEXTBOOK

Classroom Manual: Automatic Transmissions & Transaxle, Jack Erjavec, 4th Edition, Thomson Delmar Learning, 2007
Shop Manual: Automatic Transmissions & Transaxle, Jack Erjavec, 4th Edition, Thomson Delmar Learning, 2007

SUPPLIES:

Students will need course textbook, job sheets, paper, notebook, pen and pencils.

COURSE GRADE EVALUATION:

25% Professionalism (*A grade will be assessed using the following guide lines.*)
Punctuality
Desire to learn
Appropriate appearance
Quality workmanship
Ability to work with others
Safe working habits (*Students will be graded in all areas of shop safety.*)
Positive attitude
Work ethics
Integrity
Attendance
25% Research Paper and/or Final Exam
25% Lab Participation
25% Quizzes and/or Daily Task (*Quizzes maybe verbal/written*)

Also see instructor information sheet:

ATTENDANCE POLICY:

Students are expected to attend all classes in which they are enrolled. The college requires instructors to keep accurate student attendance records; therefore, any student who must be absent from class for any reason should immediately consult with his/her instructor regarding the absence. **YOUR** attendance is the greatest predictor of your success. **Student attendance at EVERY class is expected.** You should expect that each absence will adversely affect your course grade. (*For more information, refer to the catalog section; Academic and Class Information, currently on page 42 in the 2009-2011 catalog.*)

ACADEMIC ETHICS:

You are expected to participate and contribute as a group in the labs and classroom; test will be taken without notes or other outside-assistance. If unethical behavior is detected, all parties involved will be denied credit for that project or exam. The questioned material and report of the ethics violation will be submitted to the department chair for further action if deemed necessary.

STUDENT ASSISTANCE:

- Admissions: 432-335-6432
- Auto/Diesel Department Chair: 432-335-6633
- Book Store: 432-335-6655
- Cafeteria: 432-335-6435
- Career Services: 432-335-6433
- Cashier's: 432-335-6419
- Counseling: (Help center) 432-335-6433
Rosie Aguilar 432-335-6741
- Dollars for Scholars 432-335-6648
- .edu: (Student Service Center) 432-335-6894
- Financial Services: 432-335-6429
- Housing/Judicial Affairs: 432-335-6300
- Learning Resources Center: 432-335-6640
- Office of Disability Services 432-335-6861

What a student with a documented disability must do to obtain services

A student with a documented disability planning to attend classes and needing to request accommodations must present the appropriate documentation to the Office of Disability Services, located in the Student Union Building/ Help Center. It is recommended that the student meet with the Special Populations advisor three weeks prior to the beginning of the semester to make the necessary arrangements for the needed accommodations. Please call Becky at 335-6861 or send an email to brivera@odessa.edu for additional information or to make an appointment.

- Phi Theta Kappa 432-335-6533
- Registrar: 432-335-6404
- Sports Center 432-335-6476
- Student Learning Center:
Peer tutoring available
PLATO: Computer tutoring available
(LRC 300) 432-335-6673
- Student Support Services: 432-335-6476
- Technical Studies Dean: 432-335-6686
- Testing Center: 432-335-6620
- Vice President Instruction: 432-335-6413
- Vice President for Student Services:
432-335-6684
- Wi-Fi Java, Cyber Café: 432-335-6891
- Wrangler Express Center 432-335-6849

FACULTY:

James McCutcheon, chair;	Office Dm102	432-335-6633	jmccutcheon@odessa.edu
Jerry Griffith	Office Dm101	432-335-6632	jgriffith@odessa.edu
Perry Griffith	Office Dm105A	432-335-6603	pgriffith@odessa.edu

LAB REQUIREMENTS:

General Shop Practices and Procedures

- **Safety requirements will be strictly enforced: comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, proper ventilation, and the handling, storage, and disposal of chemicals in accordance with local, state, and federal environmental regulations.**
- Proper **Personal Protection Equipment (PPE)** will be used in all required areas.
- **Safety Glasses** must be worn **at all times** in the **lab/shop area**. No exceptions!
- **Adhere to all Safety signs** posted on equipment, fire extinguishers, tool groups, vehicle lifts, support stands, grinders, drill presses, or any other equipment or areas marked with Safety signage.
- Do not restrict the passage of any marked walkway.
- **Safety is paramount** and you are responsible for your work area and your safe work habits! **Therefore, do not leave fluid spills on floor and keep your area free of clutter!**
- Equipment use is limited to those knowledgeable enough to operate the equipment safely; otherwise the equipment is **OFF LIMITS! (Consult your instructor).**
- Tools and equipment **will not be loaned** or taken from the Odessa College premises.
- Students **MUST** sign out for any specialty tool needed and will only be issued by an instructor or designated person. The student will be **responsible for safety and care of those tools, when finished or at the end of each lab period**, return all tools to the checkout person so they can sign the tool back in.
- NATEF job sheets will be filled out for each lab assignment. When finished, give completed job sheets to the instructor and those will be recorded on your progress report.
- All vehicles are to be treated as customer vehicles. As a student **YOU ARE TO RESPECT THIS**, do not sit in, lean on, or handle any vehicle that has not been specifically assigned to you by your instructor.
- Any time a vehicle hood is open, fender covers must be in place on the fenders at all times.
- Students must get approval from the instructor **before** bringing vehicles in the shop. **Only certain vehicles qualify for NATEF required tasks.**
- Visitors are not allowed in the lab/shop area, however they may be escorted through the lab/shop area by approved personal.

COURSE COMPETENCIES:

NATEF RECOMMENDED TASKS FOR AUTOMOTIVE TECHNOLOGY

AUTOMATIC TRANSMISSION/ TRANSAXLE

For every task in Automatic Transmission and Transaxle, the following safety requirement must be strictly enforced as a number 1 priority: Comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, and handling, storage and disposal of chemicals in accordance with local, state, and federal safety and environmental regulations, listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

II. AUTOMATIC TRANSMISSION/TRANSAXLE

II.A General Transmission and Transaxle Diagnosis

Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.

Task	Job Sheet	Priority	
A.1	1	P1	Identify and interpret transmission/transaxle concern; assure proper engine operation; determine necessary action.
A.2	2	P1	Research applicable vehicle and service information, such as transmission/transaxle system operation, fluid type, vehicle service history, service precautions, and technical service bulletins.
A.3	3	P1	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals).
A.4	3	P1	Diagnose fluid loss and condition concerns; check fluid level on transmissions with and without dip-stick; determine necessary action.
A.5	4	P1	Perform pressure tests; determine necessary action.
A.6	5	P1	Perform stall test; determine necessary action.
A.7	6	P3	Perform lock-up converter system tests; determine necessary action.
A.8	7	P3	Diagnose mechanical and vacuum control system concerns; determine necessary action.
A.9	8	P2	Diagnose noise and vibration concerns; determine necessary action.
A.10	2	P2	Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.
A.11	9	P1	Diagnose pressure concerns in the transmission using hydraulic principles (Pascal's Law).
A.12	10	P2	Diagnose electrical/electronic concerns using principles of electricity (Ohms Law).

II.B Transmission and Transaxle Maintenance and Adjustment

B.1	11	P1	Inspect, adjust, or replace throttle linkages or cables, transmission range sensor; check gear select indicator.
B.2	12	P1	Service transmission; perform visual inspection; replace fluids and filters.

II.C In-vehicle Transmission and Transaxle Repair

C.1	8	P3	Inspect, adjust or replace (as applicable) vacuum modulator; inspect and repair or replace lines and hoses.
C.2	13	P3	Inspect, repair, and replace governor assembly.
C.3	14	P2	Inspect and replace external seals and gaskets.
C.4	15	P3	Inspect extension housing; bushings and seals; perform necessary action.
C.5	15	P2	Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.
C.6	16	P1	Diagnose electronic transmission control systems using a scan tool; determine necessary action.
C.7	17	P2	Inspect, replace, and align power train mounts.

D.1 Removal, Disassembly, and Reinstallation

D.1.1	18	P2	Remove and reinstall transmission and torque converter (rear wheel drive).
D.1.2	18	P1	Remove and reinstall transaxle and torque converter assembly.
D.1.3	19	P1	Disassemble, clean, and inspect transmission/transaxle.
D.1.4	20	P2	Inspect, measure, clean, and replace valve body (includes surfaces and bores, springs, valves, sleeves, retainers, brackets, check-balls, screens, spacers, and gaskets).
D.1.5	21	P3	Inspect servo bore, piston, seals, pin, spring, and retainers; determine necessary action.
D.1.6	21	P3	Inspect accumulator bore, piston, seals, spring, and retainer; determine necessary action.
D.1.7	22	P1	Assemble transmission/transaxle.
D.1.8	23	P1	Inspect, leak test, and flush cooler, lines, and fittings.

D.2 Oil Pump and Converter

D.2.1	24	P2	Inspect converter flex plate, attaching parts, pilot and pump drive and seal areas.
D.2.2	25	P2	Measure torque converter end play and check for interference; check stator clutch.
D.2.3	26	P1	Inspect, measure, and replace oil pump assembly and components.

II.D.3 Gear Train, Shafts, Bushings, and Case

Task	Job Sheet	Priority	
D.3.1	22	P1	Measure end play or preload; determine necessary action.
D.3.2	27	P2	Inspect, measure, and replace thrust washers and bearings.
D.3.3	28	P2	Inspect oil delivery seal rings, ring grooves, and sealing surface areas.
D.3.4	27	P2	Inspect bushings; determine necessary action.
D.3.5	29	P2	Inspect and measure planetary gear assembly (includes sun, ring gear, thrust washers, planetary gears, and carrier assembly); determine necessary action.
D.3.6	30	P2	Inspect case bores, passages, bushings, vents, and mating surfaces; determine necessary action.
D.3.7	31	P2	Inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform necessary action.
D.3.8	32	P2	Inspect, measure, repair, adjust or replace transaxle final drive components.
D.3.9	33	P3	Inspect and replace parking pawl, shaft, spring, and retainer; determine necessary action.

II.D.4 Friction and Reaction Units

D.4.1	34	P2	Inspect clutch drum, piston, check balls, springs, retainers, seals, and friction and pressure plates; replace as needed.
D.4.2	35	P1	Measure clutch pack clearance; determine necessary action.
D.4.3	35	P1	Air test operation of clutch and servo assemblies.
D.4.4	34	P1	Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; replace as needed.
D.4.5	36	P2	Inspect bands and drums; determine necessary action.