

# Syllabus AT-14 Manual Drivetrain and Axle

## Course Information

- Semester and Year: Spring 2026
- Course ID and Section number: AT-14 E9883
- Instructor's name: Anibal Florez
- Day and time of required meetings: Tuesdays and Thursdays from 8:15am to 12:35pm
- Location: Eureka's main campus AT-128 and AT-129
- Number of exams proctored: 5
- Course units: 4

## Instructor Contact Information

- Office location: AT-141
- Office hours: By appointment
- Phone number: 707-476-4373
- Email address: Anibal-Florez@redwoods.edu

## Required Materials:

- Safety Glasses ANSI Z87.1 +
- Closed toed shoes
- Course Textbook

## Catalog Description

A course covering theory and principles of manual drivetrains and axles, clutches, drive shafts, half shafts, variable and constant velocity joints, differentials, rear wheel drive axle assemblies, all wheel drives, and four-wheel drives. Gear types, ratios, compound ratios, and current noise, vibration, and harshness diagnostic routines will be discussed. Diagnosis, repair, overhaul, and adjustment procedures for common domestic, import, and light truck drivetrain components will be emphasized. The course is designed in conjunction with National Automotive Technicians Education Foundation (NATEF), standards and subsequently will prepare the student for the ASE Manual Drivetrain and Axle Certification Examination.

## Course Student Learning Outcomes

1. Perform general drivetrain diagnosis
2. Diagnose and repair clutches.
3. Diagnose and repair transmissions and transaxles.

## Textbook information

Title & Edition: Automotive Drivetrain & Manual Transmissions

Author: Keith Santini, Kirk VanGelder

ISBN: 978-1-284-14526-7

## Course Calendar

Topic or Focus	Shop/Lab	Text Chapters
1/20	Orientation & Shop Safety	
1/22	Strategy based diagnosis	Ch 1
1/27	Vehicle, Customer, and Service Information	Ch 2
1/29	Manual Transmission and Driveline Fundamentals	Ch 3
2/3	<b>Test I</b>	
2/5	FWD Axle                      Axle Service	Ch 5
2/10	FWD Axle                      Axle Service	Ch 5
2/12	RWD Drive Shaft          Drive Shaft Service	Ch 5
2/17	RWD Drive Shaft          Drive Shaft Service	Ch 5
2/19	<b>Field Trip (TBD)</b>	
2/24	<b>Test II</b>	
2/25	Clutches Service & Trans R&R	Ch 6, 7
3/3	Clutches Service & Trans R&R	Ch 6, 7
3/4	Clutches Service & Trans R&R	Ch 6, 7
3/10	Clutches Service & Trans R&R	Ch 6, 7
3/12	Clutch job wrap up and review	Ch 6, 7
<b>3/17</b>	<b>Spring Break</b>	
<b>3/19</b>	<b>Spring Break</b>	
3/24	<b>Test III</b>	
3/26	RWD Transmission      Service & Disassembly	Ch 4, 12, 13
4/2	RWD Transmission      Service & Disassembly	Ch 4, 12, 13
4/7	RWD Transmission      Service & Disassembly	Ch 4, 12, 13
4/9	RWD Transmission      Service & Disassembly	Ch 4, 12, 13
4/14	RWD Transmission      Service & Disassembly	Ch 4, 12, 13
4/16	FWD Transaxle            Service & Disassembly	Ch 4, 12, 14
4/21	FWD Transaxle            Service & Disassembly	Ch 4, 12, 13
4/23	<b>Test IV</b>	
4/28	RWD Axles                      Service & Disassembly	Ch 8, 9
4/30	RWD Axles                      Service & Disassembly	Ch 8, 9
5/5	RWD Axles                      Service & Disassembly	Ch 8, 9
5/7	<b>Test V</b>	
5/12	<b>Comprehensive Final</b>	

# Evaluation and Grading Policy

## Theory Portion

Test I Powertrain Basics	60 points
Test II FWD & RWD Shafts, Joints, & Service	60 points
Test III Clutches & Clutch Service	60 points
Test IV Manual Transmissions & Transaxles	60 points
Test V RWD Axle Assemblies	60 points
Assignments	100 points
Final Exam Comprehensive	<u>100 points</u>
<b>Total lecture Points</b>	<b>500 points</b>

## Extra Credit

Each student may elect independently to read and report on a topic related to manual transmissions from a source other than the course text i.e. trade publications, library reference material, magazines, newspaper articles, etc... The report must be no less than one page typed and no longer than three pages typed. You must properly cite your references on a separate page. You may earn up to 50 points per report, and you may turn in a maximum of 1 report per semester. Please inform the instructor of your topic prior to doing this assignment.

There are additional Ford and Subaru options for extra credit work. Ask your instructor.

## Laboratory Portion

Introduction module labs first and second week.	20 points
Diagnose: half-shaft, run out, and balance problems, remove and reinstall, replace cv joint and boot, and lube properly. Measure drive-shaft runout, check balance, R&R U-joint, measure driveline angles, R&R driveshaft.	80 points
Remove transmission/transaxle R&R and inspect clutch, flywheel, bell housing, and crankshaft endplay; Reinstall transmission/transaxle.	125 points
Disassemble, inspect, measure clearances, adjust, clean, and identify components; determine necessary action and reassemble a manual transmission.	100 points
Disassemble, inspect, measure clearances, adjust, clean, and identify components; determine necessary action and reassemble a manual transaxle.	75 points
Disassemble RWD axle assembly, inspect, clean, measure runout, adjust backlash and pinion depth as necessary and reassemble.	<u>100 points</u>
<b>Total Possible Lab Points</b>	<b>500 points</b>

## Prerequisites/corequisites/ recommended preparation

None.

## Educational Accessibility and Support

College of the Redwoods is committed to providing reasonable accommodation for qualified students who could benefit from additional educational support and services. You may qualify if you have a physical, mental, sensory, or intellectual condition which causes you to struggle academically, including but not limited to:

- Mental health conditions such as depression, anxiety, PTSD, or bipolar disorder
- Common ailments such as arthritis, asthma, diabetes, autoimmune disorders, and diseases
- Temporary impairments such as a broken bone, recovery from significant surgery, or a pregnancy-related disability
- Neurodevelopmental disorders such as a learning disability, intellectual disability, autism, acquired brain injury, or ADHD
- Vision, hearing, or mobility conditions

Available services include extended test time, quiet testing environments, academic assistance and tutoring through the [LIGHT Center](#), counseling and advising, alternate formats of course materials (e.g., audio books, braille, E-texts), assistive technology, learning disability assessments, approval for personal attendants, interpreters, priority registration, on-campus transportation, adaptive physical education and living skills courses, and more. If you believe you might benefit from disability- or health-related services and accommodations, please contact [Student Accessibility Support Services \(SASS\)](#). If you are unsure whether you qualify, please contact Student Accessibility Support Services (SASS) for a consultation: [sass@redwoods.edu](mailto:sass@redwoods.edu).

### SASS office locations and phone numbers

#### Eureka campus

- Phone: 707-476-4280
- Location: Learning Resource Center (Library)

#### Del Norte campus

- Phone: 707-465-2353
- Location: main building, near the Library

#### Klamath-Trinity campus

- Phone: 707-476-4280