

Syllabus for AT-20

Course Information

Semester & Year: Spring 2025

Course ID & Section #: AT-20-E7630 Automotive Steering & Suspension

Instructor's name: Anibal Florez

Day/Time of required meetings: Tuesdays and Thursdays at 1:15pm – 5:35pm

Location: AT-129

Number of exams: 5 plus the final

Course units: 4

Instructor Contact Information

Office location: AT-141 is my campus office.

Office hours: By appointment is preferred.

Phone number: 707-476-4373

Email address: Anibal-Florez@redwoods.edu

Catalog Description

A course covering the theories and principles related to automotive steering and suspension systems. Topics will include tire and wheel balancing, alignment angles, steering system geometry and supplemental restraint systems (SRS). The laboratory portion of the course will include diagnosis, adjustment, repair, and replacement techniques for automotive and light truck suspension and steering components. Automotive alignment measuring and adjusting procedures will be emphasized. The course is designed in conjunction with ASE Education Foundation (ASE) standards and subsequently will prepare the student for the ASE Suspension & Steering Certification Examination.

Course Student Learning Outcomes

1. Diagnose general suspension and steering systems.
2. Diagnose and repair wheel alignment problems.
3. Diagnose and repair wheel and tire problems

Prerequisites/co-requisites/ recommended preparation

It is strongly suggested as preparation for this class that each student start reading the text before the semester begins.

Textbook information

Title: Automotive Steering and Suspension

Author: John F. Kershaw, Ed.D., Kirk VanGelder

ISBN: 978-1-284-10209-3

Educational Accessibility & Support

College of the Redwoods is committed to providing reasonable accommodations 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.

SASS office locations and phone numbers

Eureka campus

- Phone: 707-476-4280
- Location: Student Services building, first floor SS113

Del Norte campus

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

Klamath-Trinity campus

- Phone: 707-476-4280

Student Support Services

Good information and clear communication about your needs will help you be successful. Please let your instructor know about any specific challenges or technology limitations that might affect your participation in class. College of the Redwoods wants every student to be successful.

The following online resources are available to support your success as a student:

[CR Online Learning Support](#)

Tech support, laptop loans, guides to using Canvas, installing Office 365 for free, and more.

[Library Articles & Databases](#)

Find the best library databases for your research.

[Online Tutoring Resources](#)

Participate in tutoring over Zoom.

To learn more about the resources available to you, click on a title bar below, or click the down arrow to expand them all.

Klamath-Trinity students can contact the CR Klamath-Trinity Office for specific information about student support services at 530-625-4821.

Community College Student Health and Wellness

National Suicide Prevention Lifeline

If you are in distress or are with someone at risk right now, call or text the National Suicide Prevention Lifeline.

Call the National Suicide Prevention Lifeline

1-800-273-TALK (8255)

Text the National Suicide Prevention Lifeline

741-741

Timely Care

When you're not feeling well physically or distressed mentally, Timely Care can offer the help you're looking for in just a few quick taps. Students can schedule an appointment anytime via phone, video, and chat. [Log in or set up an account with Timely Care.](#)

Mental Health Counseling

Students should text, email, or fax Shawna Bell directly for scheduling and/or services.

- Text: 707-496-2856
- Email: shawnabmft@gmail.com
- Fax and voicemail: 707-237-2318

Wellness Central

Resources, tools, and trainings regarding health, mental health, wellness, basic needs and more designed for California community college students, faculty and staff are available on the California Community Colleges [Wellness Central](#).

Counseling

[Counseling and Advising](#) can assist students in need of academic advising and professional counseling services. Call, email or stop by one of our offices to make an appointment!

Counseling and Advising office locations and contact info

Eureka campus

- Phone: 707-476-4150
- Location: Student Services Building, first floor
- Email: counseling@redwood.edu
- Hours: Monday through Friday, 9am to 4pm. Summer hours may vary

Del Norte campus

- Phone: 707-476-2300
- Location: Main Building, next to the library
- Hours: Summer hours may vary

Klamath-Trinity campus

- Phone: 530-625-4821
- Email: KT-staff@redwoods.edu
- Hours: Summer hours may vary

Basic Needs Center

[Basic Needs Center](#) provides for the health and safety of students by providing access to healthy food, financial resources, and referrals to safe and secure housing. [Submit a request for services and information](#).

Basic Needs Center contact info

- Phone: 707-476-4153
- Email: the-grove@redwoods.edu

Learning Resource Center

The Learning Resource Center includes the following resources for students:

Library Services

[Introduction - Library Services for Students - LibGuides at College of the Redwoods](#) promotes information literacy and provides organized information resources.

Multicultural and Equity Center (MCE)

The [Multicultural and Equity Center](#) is a dynamic and inclusive place that supports all students in their academic and personal journeys at the college. We do this by creating community, home away from home, and a safe place for cultural expression, cross-cultural learning, access to college and dignity resources, and social justice work opportunities. The MEC is committed to retention and student success by offering activities related to leadership development, student connectedness and student equity. We are a student-centered program that fosters respect for all people.

Academic Support Center

The [Academic Support Center](#) offers tutoring and test proctoring for CR students.

Student Tech Help

Technical [Support](#) provides students with assistance around a variety of tech problems.

Extended Opportunity Programs and Services (EOPS)

[EOPS/CARE](#) (EOPS) provides services to eligible income disadvantaged students including: textbook awards, grants, career academic and personal counseling, transportation assistance, tutoring, laptop, calculator and textbook loans, priority registration, graduation cap and gown, workshops, and more!

TRiO Student Success Program

The TRiO Student Support Services Program provides eligible students with a variety of services including academic advising, career assessments, assistance with transfer, and peer mentoring. Students can apply for the program with the [Eureka TRiO office](#) or the [Del Norte TRiO office](#).

Veterans Resource Center

The [Veterans Resource Center](#) supports and facilitates academic success for Active Duty Military, Veterans and Dependents attending CR through relational advising, mentorship, transitional assistance, and coordination of military and Veteran-specific resources.

CalWORKS

California Work Opportunity & Responsibility to Kids ([CalWorks](#)) provides supportive services to student parents with children under the age of 18, who are receiving cash assistance (TANF benefits), to become self-sufficient. Services include: transportation assistance, basic student supplies, tutoring, priority registration, laptop and calculator loans, career, academic, and personal counseling, and more!

Spring 2025 Dates

Date	To Remember
January 17	Last day to register for classes (day before the first class meeting)
January 18	Classes begin
January 20	Martin Luther King's Birthday (All Campuses Closed)
January 24	Last Day to add a class
January 31	Last Day to Drop & Receive a Refund
February 2	Last Day to Drop w/out a "W"
February 3	Census Date (20% of class)
February 14	Lincoln's Birthday (All Campuses Closed)
February 17	President's Day (All Campuses Closed)
March 6	Last Day to Petition to Graduate & Petition for Certificate
March 17 - 22	Spring Break (No Classes)
March 28	Last Day for Student/Faculty Withdrawal
March 31	Cesar Chavez Day (All Campuses Closed)
May 10 - 16	Final Examinations

May 16	Last Day to File P/NP Option
May 16	Semester Ends
May 23	Grades Due
May 30	Grades Available for Transcript Release

Academic dishonesty

In the academic community, the high value placed on truth implies a corresponding intolerance of scholastic dishonesty. In cases involving academic dishonesty, determination of the grade and of the student's status in the course is left primarily to the discretion of the faculty member. In such cases, where the instructor determines that a student has demonstrated academic dishonesty, the student may receive a failing grade for the assignment and/or exam and may be reported to the Chief Student Services Officer or designee. The Student Code of Conduct ([AP 5500](#)) is available on the College of the Redwoods website. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the [2024-2025 College Catalog](#) and [CR Board and Administrative Policies](#).

Disruptive Behavior

Student behavior or speech that disrupts the instructional setting will not be tolerated. Disruptive conduct may include, but is not limited to: unwarranted interruptions; failure to adhere to instructor's directions; vulgar or obscene language; slurs or other forms of intimidation; and physically or verbally abusive behavior. In such cases where the instructor determines that a student has disrupted the educational process, a disruptive student may be temporarily removed from class. In addition, the student may be reported to the Chief Student Services Officer or designee. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the [2024-2025 College Catalog](#) and [CR Board and Administrative Policies](#).

Inclusive Language in the Classroom

College of the Redwoods aspires to create a learning environment in which all people feel comfortable in contributing their perspectives to classroom discussions. It therefore encourages instructors and students to use language that is inclusive and respectful.

Canvas Information

- Log into Canvas at [My CR Portal](#)
- For help logging in to Canvas and general tech help, visit [Canvas Support Home](#)
- Once you're logged in to Canvas, you click on the Help icon on the left menu
- Canvas online orientation workshop: [Canvas Student Orientation Course](#)

Setting Your Preferred Name and Pronouns in Canvas

Students have the ability to display personal pronouns and an alternate first name in Canvas. Students may change their pronouns on their own in Canvas (Account :: Settings :: Edit Settings). To request a change to your preferred list name,

contact [Admissions and Records](#). Your Preferred Name will only be listed in Canvas; this does not change your legal name in our records. See the [Student Information Update form-2022.pdf](#).

Emergency Procedures / Everbridge

College of the Redwoods has implemented an emergency alert system called Everbridge. In the event of an emergency on campus you will receive an alert through your personal email and/or phones. Registration is not necessary in order to receive emergency alerts. Check to make sure your contact information is up-to-date by logging into [WebAdvisor](#) and selecting 'Students' then 'Academic Profile' then 'Current Information Update.'

Please contact Public Safety at 707-476-4112 or campus-safety@redwoods.edu if you have any questions. For more information visit [Campus Safety](#). Please review the [EurekaEmergencyMap_S24.pdf](#) for campus evacuation sites, including the closet site to this classroom (posted by the exit of each room).

In an emergency that requires an evacuation of the building anywhere in the District:

- Be aware of all marked exits from your area and building
- Once outside, move to the nearest evacuation point outside your building
- Keep streets and walkways clear for emergency vehicles and personnel

Do not leave campus, unless it has been deemed safe by the campus authorities.

To learn more about campus-specific Emergency Procedures, click on a title bar below, or click the down arrow to expand them all.

Eureka Campus Emergency Procedures

Please review the [campus emergency map](#) for evacuation sites, including the closest site to this classroom (posted by the exit of each room). For more information on Public Safety go to the [Redwoods Public Safety Page](#). It is the responsibility of College of the Redwoods to protect life and property from the effects of emergency situations within its own jurisdiction.

In the event of an emergency:

1. Evaluate the impact the emergency has on your activity/operation and take appropriate action.
2. Dial 911, to notify local agency support such as law enforcement or fire services.
3. Notify Public Safety 707-476-4111 and inform them of the situation, with as much relevant information as possible.
4. Public Safety shall relay threat information, warnings, and alerts through the Everbridge emergency alert system, Public address system, and when possible, updates on the college website, to ensure the school community is notified.
5. Follow established procedures for the specific emergency as outlined in the College of the Redwoods Emergency Procedure Booklet, (evacuation to a safe zone, shelter in place, lockdown, assist others if possible, cooperate with First Responders, etc.).
6. If safe to do so, notify key administrators, departments, and personnel.
7. Do not leave campus, unless it is necessary to preserve life and/or has been deemed safe by the person in command.

Communication Guidelines

- Response times to emails and messages – in general I will reply within a couple of business days.
- My general availability – Email and phone anytime to schedule.
 - I prefer emails but you can call my office anytime. Emails are usually the better way.
 - Please try to schedule an office visit. However, you are always welcomed to stop by.
- Please make use of my office hours. Come on by! Even if it's outside of the office hour scheduled.
- Timeline for offering substantive feedback on assignments – in general about a week.
- Expectations for how students should engage with each other – You are all peers taking part in the same automotive program. Each of you have different skill sets and knowledge. Everyone, including me, will benefit from open and honest communication that is respectful and encouraging. We are all in this together, let us bring each other up.

Instructor Expectations of Students

Your commitment will require at least as much time as you dedicate to a traditional class. A typical three credit hour class will require about nine hours per week of your time. You will need to carefully read the textbook chapters, participate in activities, and participate in online discussions if any, complete quizzes and tests including the final exam. Conscientiousness, attention to details, and skills in reading and writing are critical for success.

Student Expectations of Instructor

I will access the class website regularly and respond to posted questions and messages. Additionally, I read every discussion forum post and occasionally participate. There is also regular instructor-based communication with weekly announcements, lectures, evaluative feedback to your discussion posts, completed labs, homework, answer questions and or email/message students who fall behind.

Supplies

1. Each student is required to purchase in advance and have available a #2 pencil or pen.
2. Safety glasses are required for all lab activities. Students are required to purchase OSHA/ANSI approved safety glasses and wear them at all times when working in the lab.
3. Work attire is recommended. Supply your own coveralls, shop coat or work pants, shirt and closed toed shoes.
4. Class textbook(s).
5. Each student should be prepared to supply any additional personal protective equipment not furnished by the college.
6. 882-E long scantron forms.

Course Requirements

1. Complete the assignments & tests– Read assigned chapters prior to coming to class.
2. Access to the internet to actively participate in online assignments.
3. Regular attendance.
4. Actively participate in shop assignments while striving for improvement.
5. Refrain from using personal electronic devices unless it pertains to the class.
6. Must use safety glasses.
7. Everyone will comply with the latest COVID-19 Social Distancing and Safety Guidelines.
8. No student parking allowed in the automotive compound unless otherwise discussed.

Degree/Certificate

An Associate of Science Degree in Automotive Technology is available as well as two types Certificates of Achievement. For more information consult the college catalog for specific requirements and/or contact Counseling/Advising at 476-4150 to develop a student education plan.

Automotive Work Experience

Additional units are available for working in the field. Contact the Work Experience Coordinator at 476-4341

Course Evaluation

Your performance objectives, exams, and laboratory activities will be translated to points and points to grades. There are 1000 possible points, and the following distribution will guarantee the following:

- 1000 - 900 = A, A-
- 899 - 800 = B-, B, B+
- 799 - 700 = C, C+
- 699 - 600 = D
- 599 - 500 = F

Course Schedule

This course is scheduled to meet twice a week.

During each of those 4.25 we will carry out specific shop activities related to the textbook material.

It is important that each student do the scheduled reading before coming to class. There is a lecture each day and the shop time that follows the lecture is to reinforce the concepts and theories that each student is responsible for studying ahead of class time.

Attendance

The college assumes that students will attend every session of a class for which they are registered. If, however, attendance is irregular, students may be dropped from a class. Excessive absence is defined as a total of absences which equal two weeks in a 16 week semester, for a class meeting twice per week that would equate to 4 absences. For attendance purpose, the college regards a laboratory session as the equivalent of one class meeting.

Veterans and financial aid recipients should remember that should they drop below the number of units required of them by the Veterans Administration or financial aid office for any reason during the semester, including being dropped from a class for excessive absences, they will lose part of the government assistance allowances and may be required to repay funds already disbursed.

In any event if an attendance problem does develop, work with the instructor to resolve it. The purpose here is to see what we can do together to keep you in the class in order to help you master the course content.

Course Attendance Policy

Attendance will be taken at the start of each class session. **Students who accumulate 5 absences during the**

first 10 weeks of class will be dropped from this class by the instructor, no exceptions.

Punctuality is essential in the workplace and is considered respectful of fellow students and instructors. Excessive tardiness can affect your score as well. Less time present means you have less time to complete tasks.

Students who have experienced extenuating circumstances can complete & submit the **Excused Withdrawal Petition** to request an Excused Withdrawal (EW) grade instead of the current Withdrawal (W) or non-passing (D, F & NP) grades. The EW Petition is available from the Admissions and Records Forms Webpage. Supporting documentation is required.

Tips for Students

ASE-Certified Master Technicians were surveyed for their advice to students who want to become automotive service professional. Although the survey was especially for students, the tips that were suggested are applicable to all automotive technicians, from the newest to the most experienced. The following is a compilation of the responses:

- 1 Education, Education, Education – Continue your education and develop strong math, reading, study skills and computer skills. **A strong background in electronics is beneficial.**
- 2 Take advantage of on-the-job training, apprenticeship opportunities – Get all the training you can and start in a work environment that caters to service and excellence.
- 3 Keep abreast of new technology – Make a commitment to life-long learning. There is a constant change in technology so take advantage of additional training whenever it is available.
- 4 Learn a systems approach – Vehicles today are complex, so it is necessary to understand the interaction of electrical and mechanical components within the total system. Learn how to understand the whole system and you can apply this knowledge across the spectrum of vehicles.
- 5 Develop good communication skills – learn not only the professional and technical skills but also communication and people skills. Your credibility is linked to your perceived competence.
- 6 Keep a positive attitude – Develop a positive outlook so that you perform proper repairs. Apply yourself – you get exactly as much out of your job as you put into it.
- 7 Take pride in your work – Work on every car as if it were your own. Whatever you do – do it well, it's your signature.
- 8 Be honest and ethical – Stay focused on what is most important, practice good work ethics, be dependable and honest, and fix it right the first time.
- 9 Cultivate professionalism in yourself and others – Act professionally, take pride in your appearance as well as in the shop area. Be a positive role model for others. Show up for work every day and always be on time.
- 10 Become ASE certified – Certification gives you an edge when you are seeking employment. Your confidence, sense of self-worth, and ability to get a job almost anywhere are improved once you become certified. ASE certification shows your employer that you have proven your technical expertise and that you are among the group of the very best technicians.

Learning Outcomes

The college strives for continual improvement in instruction through assessment of learning outcomes. These outcomes are assessed in various ways throughout the course and upon completion of the program. Please participate to the fullest of your ability in this effort to make this course and this program successful.

Program Learning Outcomes

1. Perform common service and repair tasks identified by the National Automotive Technicians Education Foundation (NATEF)/ Automotive Service Excellence (ASE).
2. Locate industry-standard diagnostic information to localize complex automotive problems.
3. Successfully perform the entry level skills and tasks required for service and repair of automotive systems.

Course Objectives

For every task, the following safety requirements must be strictly enforced:

Compliance 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/materials in accordance with local, state, and federal safety and environmental regulations.

Upon successful completion of this course the student should be familiar with the following tasks:

A.

1. Research vehicle service information such as fluid type, vehicle service history, service precautions, technical service bulletins, and recalls including xEVs and vehicles equipped with advanced driver assistance systems (ADAS). P-1
2. Identify suspension and steering system components and configurations. P-1
3. Retrieve and record on-board diagnostics, DTCs, monitor status, and freeze frame data; clear codes and data when directed. P-1
4. Disable, enable, and properly handle SRS/airbag system components during vehicle service following manufacture's procedures. P-1
5. Identify and interpret suspension and steering system concerns; determine needed action. P-1

B.

1. Inspect rack and pinion steering gear, tie rod ends (sockets), and bellows boots; repair or replace as needed. P-1
2. Inspect power steering fluid level and condition. P-2
3. Drain and replace power steering system fluid; use proper fluid type per manufacturer specification. P-2
4. Inspect for power steering fluid leakage; determine needed action. P-2
5. Remove, inspect, replace, and/or adjust power steering pump drive belt. P-2
6. Inspect, remove, and/or replace power steering hoses and fittings. P-2
7. Inspect, remove, and/or replace pitman arm, relay (centerlink/intermediate) rod, idler arm, mountings, and steering linkage damper. P-3
8. Inspect, replace, and/or adjust tie rod ends (sockets), tie rod sleeves, and clamps (non-rack and pinion). P-3
9. Inspect and test electric power steering system; determine needed action. P-1
10. Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring). P-1
11. Diagnose steering column noises, looseness, and binding concerns (including tilt/telescoping mechanisms); determine needed action. P-2
12. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine needed action. P-3
13. Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine needed action. P-1
14. Inspect steering shaft universal joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; determine needed action. P-2
15. Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets. P-2
16. Remove and reinstall power steering pump. P-2
17. Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment. P-2
18. Test power steering system pressure; determine needed action. P-3

C.

1. Inspect, remove, and/or replace upper and/or lower control arms, bushings, and shafts. P-2
2. Inspect and replace rebound/jounce bumpers. P-2
3. Inspect, remove, and/or replace track bar, strut rods/radius arms, and related mounts and bushings. P-2
4. Inspect, remove, and/or replace upper and/or lower ball joints (with or without wear indicators). P-2
5. Inspect, remove, and/or replace suspension system coil springs and spring insulators. P-2
6. Inspect, remove, and/or replace torsion bars and mounts P-3
7. Inspect, remove, and/or replace front/rear stabilizer bar (sway bar) bushings, brackets, and links. P-2
8. Inspect, remove, and/or replace strut assembly, strut coil spring, insulators, and upper strut bearing mount. P-2
9. Inspect, remove, and/or replace components of rear suspension systems (Coil, Leaf, and Torsion Beam). P-1
10. Inspect, remove, and/or replace components of electronically controlled suspension systems. P-1
11. Inspect, remove, and/or replace steering knuckle assemblies. P-2
12. Diagnose suspension system noises, body sway, and uneven ride height concerns; determine needed action P-1

D.

1. Inspect, remove, and/or replace shock absorbers; inspect mounts and bushings P-1
2. Inspect, service, and/or replace front and rear wheel bearings. P-1
3. Describe the function of electronically controlled suspension and steering systems and components, (i.e., active suspension and stability control). P-2

E.

1. Determine the need to recalibrate a vehicle's advanced driver assistance system (ADAS) that may require calibration after repairs or adjustments. P-1
2. Perform pre-alignment inspection, place vehicle in service mode as required; measure vehicle ride height; determine needed action. P-1
3. Describe four-wheel alignment angles (camber, caster, toe, setback, and thrust angle) and effects on vehicle handling\tire wear. P-1
4. Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front caster, front and rear camber, and toe as required; center steering wheel. P-1
5. Check toe-out-on-turns (turning radius); determine needed action. P-1
6. Check steering axis inclination (SAI) and included angle; determine needed action. P-1
7. Check rear wheel thrust angle; determine needed action. P-1
8. Check for front wheel setback; determine needed action. P-1
9. Identify front and/or rear cradle (subframe) misalignment; determine needed action. P-1
10. Reset steering angle sensor. P-1
11. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine needed action. P-1

F.

1. Inspect tire condition/age; identify tire wear patterns; check for correct tire size, application (service-class, load, and speed ratings), and air pressure as listed on the tire information placard/label. P-1
2. Rotate tires according to manufacturer's recommendation including vehicles equipped with tire pressure monitoring systems (TPMS) P-1
3. Dismount, inspect, and remount tire on wheel (with/without TPMS); balance wheel and tire assembly. P-1
4. Inspect tire and wheel assembly for air loss; determine needed action. P-1
5. Repair tire following tire manufacturer approved procedure. P-1
6. Identify indirect and direct tire pressure monitoring system (TPMS); calibrate/relearn system; verify operation of instrument panel lamps. P-1

7. Demonstrate knowledge of steps required to remove and replace sensors (per OEM/sensor manufacturer) in a tire pressure monitoring system (TPMS). P-1
8. Perform Road Force balance/match mounting. P-1
9. Diagnose wheel/tire vibration, shimmy, and noise; determine needed action. P-1
10. Measure wheel, tire, axle flange, and hub runout; determine needed action. P-2
11. Diagnose tire pull problems; determine needed action. P-1

Course Grading System

Theory Portion

Test I	Safety, Tools, & Measuring	50 points
Test II	Tires, Wheels, & Bearing, Service	50 points
Test III	Suspension Systems	50 points
Test IV	Wheel Alignment	50 points
Test V	Power Steering & Electronic Systems	50 points
Chapter Questions		100 points
Final Exam Comprehensive		<u>150 points</u>
Total possible Points		500 points

Extra Credit

Each student may arrange with instructor to read and report on a topic related to suspension and steering from a source other than the course text or the internet 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. 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 and agree on a topic **before** to doing this assignment.

There are additional extra credit options through Ford's online training program.

Laboratory Portion

Safety, Tools, Measuring	50 points
Tires, Wheels, Bearings	100 points
Shock and Strut Service	50 points
Suspension System Service	100 points
Wheel Alignment Service	100 points
Power Steering Service	<u>100 points</u>
Total Possible Points	500 points

AT 20 Course Calendar

Date	Topic/Focus & Shop		Assigned Reading
1-21	Introductions and shop orientation		
1-23	Safety, Tools, and Measuring		Ch. 1,2,3
1-28	Safety, Tools, and Measuring		Ch. 1,2,3
1-30	Test I	Safety, Tools, & Measuring/Open Lab	
2-4	Tires & Wheels	Tire & Wheel Service	Ch. 5,7,8
2-6	Tires & Wheels	Tire & Wheel Service	Ch. 5,7,8
2-11	Wheel Bearings	Wheel Bearing Service	Ch. 5,7,8
2-13	Wheel Bearings	Wheel Bearing Service	Ch. 5,7,8
2-18	Test II Tires, Wheels, & Bearings		
2-20	Shocks & Struts	Shock & Struts Service	Ch. 9,10
2-25	Shocks & Struts	Shock & Struts Service	Ch. 9,10
2-27	Rear Suspension	Rear Suspension Service	Ch. 9,10
3-4	Rear Suspension	Rear Suspension Service	Ch. 9,10
3-6	Front Suspension	Front Suspension Service	Ch. 9,10
3-11	Front Suspension	Front Suspension Service	Ch. 9,10
3-13	Test III	Suspension Systems/Open Lab	
3-18	Spring Break		
3-20	Spring Break		
3-25	Wheel Alignment	Wheel Alignment Service	Ch. 6,13,14
3-27	Wheel Alignment	Wheel Alignment Service	Ch. 6,13,14
4-1	Wheel Alignment	Wheel Alignment Service	Ch. 6,13,14
4-3	Wheel Alignment	Wheel Alignment Service	Ch. 6,13,14
4-8	No Class for us!		
4-10	No Class for us!		
4-15	Test IV	Wheel Alignment/Open Lab	
4-17	Rack & Pinion & Service		Ch. 11,12
4-22	Rack & Pinion & Service		Ch. 11,12
4-24	Field Trip TBD		
4-29	Steering Gear & Service		Ch. 11,12
5-1	Suspension Electronics & Electronic Service		Ch. 11,12
5-6	Suspension Electronics & Electronic Service		Ch. 11,12
5-8	Test V	Power Steering & Electronic Systems/Open Lab	
5-15	Comprehensive Final Exam Starting at 1:00pm		