

Syllabus: ATL140: Automotive Suspension and Steering Systems Fall 2024, Section 1375

Lecture: Room 2329 Lounibos Hall, Thursdays 10am to 12pm

Lab: Room 2360 Lounibos the AutoShop, Thursdays 1pm to 4:00pm

Instructor: David Lemmer Phone: (707) 695-4250c

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Office: Lounibos Service Center room 2303/AutoShop, W 10am-3pm
and by appointment.

Recommended Preparation:

Eligibility for ENGL 1A or equivalent and MATH 25 or equivalent.

Prerequisites:

Course Completion of ATL 101 and ATL 161

Course Description:

Students will learn automotive suspension and steering fundamentals including diagnosis, inspection, repair, and adjustment of automotive steering, suspension, supplemental restraint, tire pressure monitoring, and alignment systems, and theory of operation. Course prepares students to pass the Automotive Service Excellence (ASE) A4 Suspension & Steering certification test..

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Demonstrate shop safety regarding working procedures and hazardous materials and waste handling.
2. Research and identify correct procedures and specifications for maintenance and repair of suspension and steering systems.
3. Perform diagnosis, service, and maintenance procedures in a timely manner to industry standards.

Objectives:

At the conclusion of this course, the student should be able to:

1. Disable and enable Supplemental Restraint System (SRS)
2. Remove and replace steering wheel, center/time Supplemental Restraint System (SRS) coil (clock spring)
3. Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms) and determine necessary action
4. Inspect steering shaft universal joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel, and perform necessary action
5. Remove and replace manual or power rack and pinion steering gear, and inspect mounting bushings and brackets
6. Inspect and replace manual or power rack and pinion steering gear inner and outer tie rod ends (sockets) and bellows boots
7. Inspect power steering fluid levels and condition, flush, fill, and bleed power steering system
8. Diagnose power steering fluid leakage, inspect, and replace power steering hoses and fittings
9. Remove, inspect, replace, and adjust power steering pump belt
10. Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper
11. Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps
12. Diagnose short and long arm and strut suspension system noises, body sway, and uneven riding height concerns, and determine necessary action
13. Remove, inspect and install strut rods and bushings, upper and/or lower ball joints, steering knuckle assemblies, short/long arm coil springs and insulators
14. Remove, inspect, and install stabilizer bar bushings, brackets, transverse links, control arms, bushings, mounts, and links
15. Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount, and shock absorbers
16. Lubricate suspension and steering systems
17. Remove, inspect, and service or replace front and rear wheel bearings

18. Differentiate between steering and suspension concerns using principles of steering geometry (caster, camber, toe, Steering Axis Inclination (SAI))
19. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns, and determine necessary action
20. Perform pre-alignment inspection, measure vehicle riding height, and determine necessary action
21. Check and adjust front and rear wheel camber, caster, and toe, center steering wheel, check toe-out-on-turns, SAI and included angle, and rear wheel thrust angle
22. Inspect and diagnose tire wear patterns, wheel/tire vibration, shimmy, noise, tire pull (lead) problems check and determine necessary action
23. Rotate and balance wheel and tire assemblies and adjust air pressure according to manufacturer's recommendations
24. Measure wheel, tire, axle, and hub runout, and determine necessary action
25. Dismount, inspect, repair, and remount tire on wheel, balance assembly, reinstall wheel, and torque lug nuts
26. Inspection and calibration of tire pressure monitoring systems

Representative assignments:

Lecture-Related Assignments:

1. Weekly reading (25-75 pages)
2. Homework consisting of chapter review questions
3. Weekly quizzes and final exam

Lab-Related Assignments:

1. Lab demonstrations related to: the ability to follow industry approved diagnostic and repair procedures, brake assembly, lathe operation and alignment
2. Lab write-ups such as:
 - A. Reading and analyzing lab reports
 - B. Making customer recommendations
 - C. Writing diagnostic sheets in a neat, complete, and readable manner
3. Lab work such as:
 1. Disassemble components and subsystems
 2. Inspect components and subsystems
 3. Reassemble components and subsystems

Methods of Evaluation / Basis of Grade:

Writing 5%: Assessment tools that demonstrate writing skill and/or require students to organize and explain ideas in writing.

Written repair orders, notebooks.

Problem solving 10%: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem-solving skills.

Reading, chapter questions, and analyzing lab reports.

Skill Demonstrations 40%: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Machine operations, weekly repair operations

Exams 35%: All forms of formal testing, other than skill performance exams.

Multiple choice, matching items, completion

Other 5%: Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation:

Attendance at all classroom and lab sessions is expected. Missing more than 10% of this time can result in being dropped from the class. What this means is that **no more than 2** class days can be missed. **This means you may be dropped from the roster if you miss 3 class days.**

Unless otherwise informed by the instructor, grades are calculated based on total semester points that you have earned out of total points possible. Grades may be adjusted to a class curve, but you are guaranteed the grade listed in the following chart if you attain the point total associated with that grade. Please note that a passing grade is “C” or better and is required for the “Brakes” certificate.

Letter grade A = 90% - 100%

Letter grade B = 80% - 90%

Letter grade C = 70% - 80%

Letter grade D = 60% - 70% (failing)

Letter grade F = ≤ 60% (failing)

Follow your grade totals on-line. You will start at zero points and are working for a maximum total point count of approximately 1200 (look on Canvas to determine this semester’s exact count). Remember that the midterm exams count double (x2) and final exam counts triple (x3). See methods of assessment above for the weights attached to various assignments.

Textbook:

Automotive Technology: Principles, Diagnosis, and Service, 7th edition

James Halderman / Curt Ward

Published by Pearson (March 13, 2024) © 2025

ISBN-13: 9780137871797 (2024 update)

You will need the eTextbook + Study & Exam Prep Pack

Use the link in the Canvas shell to take you to the Pearson website.
This class will use only select portions as needed.

Important Dates and Deadlines:

Date Class Begins:	08/22/2024	Date Class Ends:	12/12/2024
Last Day Add w/o add code:	08/25/2024	Last Day Add with add code:	09/08/2024
Last Day Drop for Refund:	09/01/2024	Last Day for P/NP option:	
Last Day Drop w/o W:	09/08/2024	Last Day Drop with W:	12/13/2024 11/17/2024
Date First Census:	09/09/2024	Date Final Exam:	12/9/2024

Final Exam Date and Time: Please note!

The Final Exam is on Thursday, Dec 19 from 1:00pm to 3:45pm!

Course Policies

Cell Phones: Cell phones have limited value while in class or lab. A common employer's shop rule may be no cell phone use during work hours. In this class I am going to say, "no inappropriate use of the phone in class or in lab". If you are observed using your phone inappropriately in class, you may be asked to leave until the end of the next break. Multiple infractions can result in a 2-day suspension.

Note: if you receive an emergency call, please step outside to talk.

Cheating/Plagiarism: Cheating or plagiarism are unacceptable behavior and will result in an immediate two-day suspension from class for all students involved; no exceptions.

No Smoking Policy: Santa Rosa Junior College is a non-smoking campus; this includes vaping. No smoking is allowed anywhere on campus or within 20 feet of the campus.

Class Participation: Your participation in class discussions is recommended and expected. Asking questions is a short cut to knowledge.

Missed Examination Policy: Missed examinations are discouraged but may be rescheduled with the instructor on a case-by-case basis up to two weeks past the original exam date.

Late Homework / Assignment Policy: Homework and all other types of assignments will only be accepted up to two weeks late.

Attendance/Tardiness: Your attendance is expected at all class meetings; this means on time and for the whole period. Attendance will be tracked in Canvas.

PROJECTS IN THE SHOP

Lab Safety: Safe procedures take precedence over everything else in our shop! Safe clothing must be worn at all times. Safety glasses must be worn when working on projects in the shop. If it cannot be done safely, don't do it. If you have any doubt, ask the instructor or student aid. If you find yourself struggling for more than a few minutes, there is likely a tool for that or some trick of the trade. Please don't hesitate to ask, I am more than happy to share those with you.

Student Conduct:

We will conduct ourselves in a manner that reflects our awareness of common standards of decency and the rights of others. All students are expected to know the Student Conduct Code (http://www.santarosa.edu/for_students/rules-regulations/scs/section1.shtml) and adhere to it in this class. Students who violate the code may be suspended from 2 classes and referred to Vice President of Student Services for discipline.

Respect:

The best way to learn is through active participation; therefore, we respect others when talking by being on time, listening actively, and by being polite even when we disagree with another's viewpoint. Please turn off all electronic devices. If you use a laptop for note taking, please sit in the front row with the sound off. No food in class please.

Academic Integrity: All written work is to be original; plagiarism of any kind will result in a failing grade on that assignment. Students who plagiarize or cheat may be suspended [for one or two class meetings by the instructor] and referred to the Vice President of Student Services for discipline sanction, in cases of egregious violation. Please read the college policy/procedure on academic integrity at: <http://www.santarosa.edu/polman/3acadpro/3.11P.pdf>

Emergency Evacuation Plan: In the event of an emergency during class that requires evacuation of the building, please leave the class immediately, but calmly. Our class will meet at the south end of Lounibos Hall in the parking lot to make sure everyone got out of the building safely and to receive further instructions. If you are a student with a disability who may need assistance in an evacuation, please see me during my office hours as soon as possible so we can discuss an evacuation plan.

Accommodations for Students with Disabilities: If you need disability related accommodations for this class, such as a note taker, test-taking services, special furniture, etc., please provide the Authorization for Academic Accommodations (AAA letter) from the Disability Resources Department (DRD) to the instructor as soon as possible. You may also speak with the instructor privately during office hours about your accommodations. If you have not received authorization from DRD, it is recommended that you contact them directly. DRD is located in Analy Village on the Santa Rosa campus, and Jacobs Hall on the Petaluma Campus.

This syllabus is intended to give the student guidance in what may be covered during the semester and will be followed as closely as possible. However, the instructor reserves the right to modify, supplement and make changes as the course needs arise.

Pedagogical Philosophy

My philosophy is to provide you with the basic science and theory behind all of the automotive systems covered in class. In addition, I will give you practical, hands on tips for being a successful automotive technician. Ultimately, my goal is to empower you to think for yourselves to create problem solving techniques that you can use in any situation for the rest of your lives. Key to success here is communication, cooperation, creativity, and a desire for excellence. Automotive technology is evolving as rapidly now as it ever has. Keeping up with that promises to be as rewarding as it is challenging. I promise to be your partner and mentor as you begin your trek down this path.

This syllabus is an agreement, continued participation in this class means that you agree to the policies and procedures outlined in this syllabus.

David J Lemmer
