

**Nashville State Community College  
Business, Applied Arts & Technologies Division  
Automotive Department/ ATEP Program**

**Course Syllabus**

**Suspension & Steering**

**AMT-1135**

**3 Credits, 2 Class Hours 2 Laboratory Hours**

**Instructor: Claude Whitaker**

Instructor: Claude Whitaker

Office: W-58 Phone: 353-3449

Hours M - T- W 7:00-3:00 R- 7:00-2:00 F- 8:00-12:00

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**Textbook and Other Materials:**

Automotive Technology 4<sup>th</sup> edition, James D. Halderman

Automotive Technology Curriculum University of Missouri-Columbia

**Course Description**

This is an comprehensive study of suspension systems with the emphasis on wheel alignment and suspension rebuilding. *Prerequisite: AMT-1195*

**Course Outcomes:**

Upon completion of this course, the student should be able to:

1. Rebuild front suspension, install wheel bearings, pack and adjust wheel bearings and install springs.
2. Troubleshoot and install shock absorbers.
3. Perform a front-end alignment using the D-111 and DSP 400 computer alignment equipment.
4. Use a computerized tire balancer to balance tires.
5. Troubleshoot and adjust steering gears and steering linkage.

## Course Assessments:

The student will be required to pass a series of on-the-car hands-on tasks set by the NATEF task list. (Task IV. Suspension and Steering) Evidence that the tasks have been met, the student will identify and interpret suspension and steering system concern: determine necessary action. Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions and technical service bulletins. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals.) Disable and enable supplemental restraint system. (SRS). Remove and replace steering wheel, center/time supplemental restraint system (SRS) coil (clock spring). Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets. Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (socket) and bellows boots. Inspect power steering fluid levels and condition. Remove, inspect, replace, and adjust power steering pump belt. Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mounting and steering linkage damper. Inspect, replace and adjust tie rods ends (sockets), tie rods sleeves and clamp. Diagnose short and long arm suspension system noises, body sway and uneven riding height concerns; determine necessary action. Diagnose strut suspension system noises, body sway and uneven riding height concerns; determine necessary action. Remove, inspect and install strut cartridge or assembly, strut coil spring, insulators (silencers) and upper strut bearing mount. Inspect, remove and replace shock absorbers. Remove, inspect and service or replace front and rear wheel bearings. Differentiate between steering and suspension concerns using principles of steering geometry (caster, camber, toe, etc.) Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer and steering return concern; determine necessary action. Perform pre-alignment inspection; perform necessary action. Measure vehicle riding height; determine necessary action. Check and adjust front and rear wheel camber; perform necessary action. Check and adjust caster; perform necessary action. Check and adjust front wheel toe; adjust as needed. Center steering wheel. Diagnose tire wear pattern; determine necessary action. Inspect tires; check and adjust air pressure. Rotate tires according to manufacturer's recommendations. Balance wheel and tire assembly (static and dynamic). Reinstall wheel; torque lug nuts. All these tasks will be observe by me on a one-on-one basic when in the shop.

## Grading Policy:

Grading of class:		Letter grade conversions:
Assignment /Lab Sheets	10%	A (90-100)
Unit & Mid-Term Tests (4)	20%	B (80-89)
Hands-on Components	40%	C (70-79)
Final Test	30%	D (60-69)

Lab Sheets are based on hands-on performance tasks per the GM Service Technical College and the NATEF task list.

## Laboratory Guidelines

- **Horseplay will not be tolerated**
- **When working under an automobile, you must use a creeper**

- Use all hand or special tools properly
- Do not sit in an automobile unless you are making a check or test that requires you to
- Do not run the radio or change radio setting
- Do not move the seat unless necessary
- You must use fender covers when working under the hood
- Do not use any part of an automobile for a work bench
- Every automobile must have a work order on it
- Every automobile jacked up must have jack stands under it
- You must wear safety glasses when doing the following:
 

Turning a drum/rotor	Balancing a wheel
Grinding	Drilling holes
Re-facing a valve	Using a blow gun

## Topics to Be Covered:

### Week 1 – Front Suspension

1. Springs
2. Control Arms
3. Bushing/Ball Joints/King Pins/Bearing Seals
4. Troubleshooting

### Week 2 –Rear Suspensions

1. Springs
2. Linkage
3. Troubleshooting

### Week 3 – Shock Absorbers

1. Types
2. Troubleshooting
3. Installation

### Week 4 – Wheel Alignment

1. Camber / Caster
2. Toe-in / Turning Radius
3. Adjustments

### Week 5 – Tires

1. Sizing / Types / Service
2. Balance (Static and Dynamic)
3. Wheels (Run-out)

### Week 6 – Operation of Computerized Equipment

1. Front-End Alignment
2. Tire Balance

## Week 7 – Steering Gears/Powering Steering

1. Standard
2. Steering Linkage
3. Fundamentals
4. Troubleshooting

### **Attendance Policy**

A student is expected to attend all scheduled classes and laboratories. Each instructor will formulate an attendance policy and provide it on the course syllabus. Absences are counted from the first scheduled meeting of the class, and it is the responsibility of each student to know the attendance policy of each instructor in whose class he/she is enrolled. If a student is absent from a class, he/she should give an advanced explanation to the instructor. Absences in a course may affect a student's final grade. The student is responsible for all assigned work in the course regardless of excused or unexcused absences. Tardiness may also affect a student's final grade.

Failure to attend class will result in a final course grade of "FA" or "FN" (see explanation below) depending on the individual instructor's course policy.

FA= failure, attendance-related (unofficial withdrawal) Last recorded date of attendance required.

FN= failure, never attended class (unofficial withdrawal)

### **Student Communication Channels**

It is the student's responsibility to check D2L and MyNSCC email on a regular basis. These are the official communication channels between the college and students. Students are responsible for the information communicated through those channels. D2L contains specific course information and MyNSCC contains information important for other purposes.

### **Early Warning System**

Nashville State Community College has implemented an Early Warning System to notify students via e-mail about academic problems such as poor classroom attendance, poor performance on assignments/tests, poor communication skills, late/missing assignments, and/or lack of classroom participation. Please note that Early Warning Alerts do not affect a student's academic standing.

### **ADA Compliance Statement**

Nashville State complies with the Americans with Disabilities Act. If you wish to request any special accommodations for any courses in which you are enrolled, contact the Student Disabilities Office at 353.3721.

### **Classroom Misconduct**

Nashville State Community College has a zero tolerance policy for disruptive conduct in the classroom. Students whose behavior disrupts the classroom will be subject to disciplinary sanctions. Please consult your Student Handbook for more specific details.

The instructor has primary responsibility for control over classroom behavior and maintenance of academic integrity. He/she can order temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or in conduct which violates the general rules and regulations of the College.

Disruptive behavior in the classroom may be defined as, but is not limited to, behavior that obstructs or disrupts the learning environment (e.g., offensive language, harassment of students and professors, repeated outbursts from a student which disrupt the flow of instruction or prevent concentration on the subject taught, failure to cooperate in maintaining classroom decorum, etc.), the continued use of any electronic or other noise or light emitting device which disturbs others (e.g., disturbing noises from beepers, cell phones, palm pilots, lap-top computers, games, etc.).

Please be aware that children are not allowed in class or unattended on campus.

### **Academic Dishonesty (Honor Code)**

Any form of academic dishonesty, cheating, plagiarizing, or other academic misconduct is prohibited. "Plagiarism may result from: (1) failing to cite quotations and borrowed ideas, (2) failing to enclose borrowed language in quotation marks, and (3) failing to put summaries and paraphrases in your own words (A Writer's Reference 331). Academic dishonesty may be defined as, but is not limited to, intentionally trying to deceive by claiming credit for the work of another person, using information from a web page or source without citing the reference, fraudulently using someone else's work on an exam, paper, or assignment, recycling your own work from another course, purchasing papers or materials from another source and presenting them as your own, attempting to obtain exams/materials/assignments in advance of the date of administration by the instructor, impersonating someone else in a testing situation, providing confidential test information to someone else, submitting the same assignment in two different classes without requesting both instructor's permission, allowing someone else to copy or use your work, using someone else's work to complete your own, altering documents, transcripts or grades, and forging a faculty/staff member's signature.

In addition to other possible disciplinary sanctions that may be imposed through regular college procedures as a result of academic dishonesty the instructor has the authority to assign an "F" or a "Zero" for the exercise, paper, or examination or to assign an "F" for the course. Students may appeal through the appropriate college grade appeal procedures.

### **Inclement Weather Policy**

In the event of an inclement weather event, check the Nashville State web site home page at [www.nsc.edu](http://www.nsc.edu) for announcements on campus closures. Campus closures will also be announced on local television stations (channels 2, 4, 5, and 17).

When classes are cancelled, an online assignment will be posted in NS Online. Check your NS Online email for a message from your instructor regarding your online assignment requirements. Even though classes may be cancelled, some areas, i.e. Testing Center, may be open. However, you should check before commuting to campus.

The Vice President for Academic Affairs and the Director of Security are responsible for cancellation decisions during an inclement weather event for the Nashville State main campus and the Southeast campus. Cookeville, Waverly, and Dickson Campus Directors will make class cancellation decisions based on conditions in their respective areas. Decisions about class cancellations are based on actual conditions, not forecasts. The perspective used for making decisions is that of the college as an employer, not as a K-12 institution. Students should use

their own best judgment in determining whether to report to campus during inclement weather when classes are not cancelled.

**NOTE:** This syllabus is meant simply as a guide and overview of the course. Some items are subject to change or may be revised at the instructor's discretion. Each instructor will further clarify their criteria for grading, classroom procedures, attendance, exams and dates, etc. on his/her course syllabus.