

COURSE SYLLABUS

AUMT 1316 (3:1:8)

**SUSPENSION AND STEERING**

AUTOMOTIVE SERVICE TECHNOLOGY

INDUSTRIAL TECHNOLOGY

TECHNICAL DIVISION

LEVELLAND CAMPUS

SOUTH PLAINS COLLEGE

## SCANS COMPETENCIES

- C-1 TIME--Selects goal--relevant activities, ranks them, allocates time, and prepares and follows schedules.
- C-2 MONEY--Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives
- C-3 MATERIALS & FACILITIES-Acquires, stores, allocates, and uses materials or space efficiently.
- C-4 HUMAN RESOURCES--Assesses skills and distributes work accordingly, evaluates performances and provides feedback.
- INFORMATION--Acquires and Uses Information
- C-5 Acquires and evaluates information.
- C-6 Organizes and maintains information.
- C-7 Interprets and communicates information.
- C-8 Uses computers to Process information.
- INTERPERSONAL--Works With Others
- C-9 Participates as members of a team and contributes to group effort.
- C-10 Teaches others new skills.
- C-11 Serves clients/customers--works to satisfy customer's expectations.
- C-12 Exercises leadership--communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
- C-13 Negotiates-Works toward agreements involving exchanges of resources resolves divergent interests.
- C-14 Works with Diversity-Works well with men and women from diverse backgrounds.
- SYSTEMS--Understands Complex Interrelationships
- C-15 Understands Systems--Knows how social, organizational, and technological systems work and operates effectively with them
- C-16 Monitors and Correct Performance-Distinguishes trends, predicts impacts on system operations, diagnoses systems' performance and corrects malfunctions.
- C-17 Improves or Designs Systems-Suggests modifications to existing systems and develops new or alternative systems to improve performance.
- TECHNOLOGY--Works with a variety of technologies
- C-18 Selects Technology--Chooses procedures, tools, or equipment including computers and related technologies.
- C-19 Applies Technology to Task-Understands overall intent and proper procedures for setup and operation of equipment.
- C-20 Maintains and Troubleshoots Equipment-Prevents, identifies, or solves problems with equipment, including computers and other technologies.

## FOUNDATION SKILLS

- BASIC SKILLS--Reads, writes, performs arithmetic and mathematical operations, listens and speaks
- F-1 Reading--locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
- F-2 Writing--Communicates thoughts, ideas, information and messages in writing, and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
- F-3 Arithmetic--Performs basic computations; uses basic numerical concepts such as whole numbers, etc.
- F-4 Mathematics--Approaches practical problems by choosing appropriately from a variety of mathematical techniques.
- F-5 Listening--Receives, attends to, interprets, and responds to verbal messages and other cues.
- F-6 Speaking--Organizes ideas and communicates orally.
- THINKING SKILLS--Thinks creatively, makes decisions, solves problems, visualizes, and knows how to learn and reason
- F-7 Creative Thinking--Generates new ideas.
- F-8 Decision-Making--Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
- F-9 Problem Solving--Recognizes problems and devises and implements plan of action.
- F-10 Seeing Things in the Mind's Eye--Organizes and processes symbols, pictures, graphs, objects, and other information.
- F-11 Knowing How to Learn--Uses efficient learning techniques to acquire and apply new knowledge and skills.
- F-12 Reasoning--Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.
- PERSONAL QUALITIES--Displays responsibility, self-esteem, sociability, self-management, integrity and honesty
- F-13 Responsibility--Exerts a high level of effort and preservers towards goal attainment.
- F-14 Self-Esteem--Believes in own self-worth and maintains a positive view of self.
- F-15 Sociability--Demonstrates understanding, friendliness, adaptability, empathy, and politeness in-group settings.
- F-16 Self-Management--Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
- F-17 Integrity/Honesty--Chooses ethical courses of action.

LEVELLAND CAMPUS

COURSE SYLLABUS

COURSE TITLE: AUMT 1316 SUSPENSION AND STEERING (3:1:8)

INSTRUCTOR: Gary Ham

OFFICE LOCATION AND PHONE/E-MAIL: Auto/Diesel Building Office # 1  
806-716-2296 [gham@southplainscollege.edu](mailto:gham@southplainscollege.edu)

OFFICE HOURS: 7:30 to 8:00 AM and 2:30 to 4:00 PM.

SOUTH PLAINS COLLEGE IMPROVES EACH STUDENT'S LIFE

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I. GENERAL COURSE INFORMATION:

- A. Course Description: This course emphasizes the theory and operation of automotive suspension and steering systems. The course includes tire and wheel problem diagnosis, component repair and alignment procedures. Also covered are diagnosis and repair of electronic load leveling systems, front and rear suspension systems, proper nomenclature and operation of all existing components. Elements of the course may be taught manufacturer specific.
- B. Course Learning Outcomes: Utilizing appropriate safety procedures, the student will identify, diagnose, repair or replace, and learn proper nomenclature of system components. Also, the student will perform two and four wheel alignment procedures; tire and service repair, and diagnose load-leveling systems.
- C. Course Competencies: Upon completion of this course the student must demonstrate the following competencies:
  - 1. Understanding of theory and operation of automotive suspension and steering systems.
  - 2. Diagnosis and service of bearings, seals, wheel hubs, front and rear drive axle assemblies.
  - 3. Develop an understanding of theory and problem diagnosis of tire-wheel assemblies.
  - 4. Diagnosis, service, and replacement of shock absorbers, front and rear struts, cartridges, and coil spring assemblies.
  - 5. Front suspension system diagnosis and service including curb height measurements, control arms, and transversely mounted torsion bars.
  - 6. Rear suspension system diagnosis and service of control arms, ball joints, leaf-springs, track bars, stabilizer bars, strut rod and adjusting links.

7. Develop an understanding of theory and diagnosis of computer-controlled suspension systems: Electronic air suspension, rear load-leveling, computer controlled ride control, and automatic air suspension systems.
8. Diagnosis and service of manual-power rack and pinion steering gear assemblies.
9. Diagnosis, measurement, and adjustments of caster and camber alignment angles.
10. Diagnosis, measurement, and adjustments of SAI, setback, toe, turning radius, steering linkage height and steering wheel centering procedures.
11. Theory, difference, and adjustment on thrust, geometric centerline, total four wheel, and computer alignments.

- D. ACADEMIC INTEGRITY: (See current college catalog for policy)
- E. SCANS and Foundation Skills. C-1 through C-20 and F-1 through F-17 See back of cover page
- F. Verification of Workplace Competencies: All graduating students in the Automotive Service Technology program will have a comprehensive, exit review exam administered in their last semester in order to comply with the state requirement for a “capstone learning experience”

## II. SPECIFIC COURSE/INSTRUCTOR REQUIREMENTS:

### A. Textbook and Other Materials:

Today’s Technician \ Automotive Suspension and Steering Systems, 4th edition, by Don Knowles. Students are required to possess a basic tool set for the program by the 12<sup>th</sup> class day.

### B. Attendance Policy: Whenever absences become excessive and, in the instructor's opinion, minimum course objectives cannot be met due to absences, the student should be withdrawn from the course. In addition, an instructor is required to notify the Office of Student Services when the student has missed every class day during any 14 consecutive calendar-day period, excluding holidays.

When an unavoidable reason for class absence arises, such as illness, an official trip authorized by the college or an official activity, the instructor may permit the student to make up work missed. It is the student’s responsibility to complete work missed within a reasonable period of time as determined by the instructor.

Students are officially enrolled in all courses in which they pay tuition and fees at the time of registration. Should a student, for any reason, delay in reporting to class after official enrollment, absences will be attributed to the student from the first meeting of the class.

A student who does not attend a class and does not officially withdraw from that course by the 12<sup>th</sup> class day in a regular semester or by the 4<sup>th</sup> class day in a summer session should be administratively withdrawn from that course and

receive a grade of “X” or “F” as determined by the instructor. Instructors are responsible by clearly stating their administrative drop policy in the course syllabus, and it is the student’s responsibility to be aware of that policy.

**Regular attendance is required.** Roll will be checked at the beginning of each class and after lunch. Absences may affect the final grade as follows:

- fourth absence (4<sup>th</sup>), final grade may be lowered 5 points
- fifth absence (5<sup>th</sup>), final grade may be lowered an additional 5 points (10 points from final grade).
- sixth absence (6<sup>th</sup>), final grade may be lowered an additional 5 points ( 15 points from final grade).

If you are absent 90 minutes or more, you will be considered absent for that day. Three (3) tardies are considered to equal 1 absence. On the 6<sup>th</sup> absence, you may be automatically dropped from all automotive courses in which you are enrolled for this semester. If the excessive absence occurs after the official drop date at the end of the semester, a grade of "F" will be issued. Tardies and absences will be applied to all courses.

- C. Assignment Policy: Class assignments and/or homework may be given at the instructor's discretion. Homework and other assignments are due on time. Late work will not be accepted. If you are late for an exam, you will not be allowed to take the exam and will receive a grade of zero on that exam. Students are expected to complete all assignments. When assigned to a lab competency, the student is expected to stay with the project until completion.
- D. Grading Policy/Procedure and/or methods of evaluation: There are three categories taken into consideration when computing the final semester grades. The percentages below will be calculated based on points given for completion of the following objectives:

1. Class Participation / Homework: 25 %
2. Skills objectives: 50%
3. Knowledge objectives: 25%

There are four levels of attainable grades in the Automotive Service Technology program. This grading policy follows industry standards used in ASE certification testing. The levels are:

- A (90 and above)
- B (80 to 89)
- C (70 to 79)
- F (69 and below)

- E. Special Requirements: The student must pass a series of comprehensive exit exams related to the main competencies covered in the automotive courses. The exams shall be administered during the last semester of the program.
- F. Behavior: The student is expected to follow all of the rules and regulations of the program, provided to you the first week of class, and posted in the classroom and lab area. Students who are deemed by their instructor to be disruptive, disrespectful, and/or otherwise detrimental to the class may be dropped from all automotive courses in which you are enrolled for the semester.

## HAZARDOUS MATERIALS

Students will come in contact with chemicals and other materials, which come under the "HAZARDOUS MATERIALS" classification as defined by Title 83, Article 5182b of the Hazard Communication Act. Material Safety Data Sheets (MSDS) information will be posted outside of office number 1. Warning signs are posted throughout the Auto/Diesel building and all appropriate personal protective equipment will be provided, which the student must use. Safety information will be given and demonstrated in class before safety quizzes and test.

### III. COURSE OUTLINE/CONTENT

- 1. Identify safety procedures and hazardous materials
  - A. Personal safety techniques
  - B. Tool and equipment safety
  - C. Hazardous chemicals
- 2. Basic theories
  - A. Identify theories which apply to steering and suspension systems
- 3. Wheel bearings
  - A. Identify types of bearings
  - B. Identify basic parts of bearings
  - C. Explain the differences between types of bearings
- 4. Tires and Wheels
  - A. Tire design
  - B. Tire ratings
  - C. Tire motion forces
  - D. Wheel rims
  - E. Static and Dynamic balance theories
- 5. Shock absorbers and struts
  - A. Explain shock absorber and strut purposes
  - B. Explain advantages between types of shocks and struts
  - C. Explain operations of shocks and struts
- 6. Front suspension systems
  - A. Identify components of front suspension systems
  - B. Explain front suspension component functions
  - C. Explain differences of various front suspension systems

7. Rear suspension systems
  - A. Identify components of rear suspension systems
  - B. Explain rear suspension component functions
  - C. Explain differences of various rear suspension systems
8. Computer controlled suspension systems
  - A. Identify types of computer-controlled suspension systems
  - B. Identify components of computer-controlled suspension systems
  - C. Explain component operations
9. Rack and pinion steering gears
  - A. Identify rack and pinion steering components
  - B. Explain component functions
  - C. Explain operations of a variety steering types
10. Camber and caster
  - A. Describe camber
  - B. Explain camber changes during various road conditions
  - C. Describe caster
  - D. Explain caster changes during various road conditions
11. Steering axis inclination, setback and toe
  - A. Explain SAI angle
  - B. Explain SAI related functions
  - C. Define setback
  - D. Explain toe and relations
12. Rear wheel alignment and computer alignment systems
  - A. Explain conditions and measurements related to rear wheel alignment
  - B. Explain four-wheel alignment
  - C. Explain chassis changes and how they effect alignment
  - D. Explain computer alignment functions Basic theories
  - E. Identify theories which apply to steering and suspension systems

#### IV. ACCOMMODATIONS:

1. See "Equal opportunity" statement in the South Plains College catalog.
2. Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Special Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Special Services Coordinator. For more information, call or visit the Special Services Office in the Student Services building, 894-9611 ext. 2529.
3. See "Special Services" statement in the South Plains College catalog.
4. *Diversity Statement:* In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.