

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Suspension & Steering I
COURSE NUMBER	AUTT-0142
DIVISION	Career and Technical Education
DEPARTMENT	AUTT
CIP CODE	47.0604
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 1 Lab: 4
PREREQUISITES	AUTT-0103
COREQUISITES	None
COURSE PLACEMENT	None

COURSE DESCRIPTION

In this course students will study and perform tasks from the National Automotive Technicians Education Foundation's (NATEF) Maintenance and Light Repair (MLR) Program. Students will: document fundamental suspension systems concern, perform fundamental diagnostics of steering systems, perform fundamental repairs of suspension systems. All students will successfully complete each element of personal safety training before working in the Automotive Laboratory.

PROGRAM ALIGNMENT

This course is part of a program aligned through the Kansas Board of Regents and Technical Education Authority. For more information, please visit:

https://kansasregents.org/workforce_development/program-alignment

PROGRAM LEARNING OUTCOMES

1. Demonstrate proper safety practices in an automotive shop environment.
2. Demonstrate workplace skills associated with a professional automotive shop.
3. Describe the fundamental elements of automotive technology including service information, tools, equipment, and maintenance procedures.

TEXTBOOKS

<http://kckccbookstore.com/>

METHODS OF INSTRUCTION

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels,

conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE

- I. General Suspension and Steering Systems Service
 - A. Work orders
 - B. Vehicle identification
 - C. Service history
 - D. Researching vehicle and service information, service precautions
 - E. Technical service bulletins
 - F. Locating vehicle and major component identification numbers
 - G. Hybrid and electric vehicle safety precautions
- II. Power Assisted Steering
 - A. Flushing, filling, and bleeding power steering
 - B. Fluid leakage
 - C. Fluid type
 - D. Power steering pump belt
 - E. Power steering pump types
 - F. Pulley press and alignment
 - G. Power steering hoses and fittings
 - H. Electronically controlled steering systems
- III. Steering Systems
 - A. Steering gear (rack and pinion)
 - 1. Mountings and bushings
 - 2. Steering gear inner tie rod ends and bellows boots
 - B. Steering gear (non-rack and pinion)
 - C. Steering linkage
 - 1. Pitman arm
 - 2. Relay (center link/intermediate) rod
 - 3. Idler arm and mountings
 - 4. Steering linkage damper
 - 5. Inspect tie rod ends (sockets)
 - 6. Tie rod sleeves and clamps
 - D. Lubrication
- IV. Suspension Systems
 - A. Short and long arm suspension system
 - 1. Upper and lower control arms
 - 2. Bushings and rebound bumpers
 - 3. Coil springs and spring insulators
 - 4. Upper and/or lower ball joints
 - B. Strut Suspension Systems
 - 1. Strut cartridge assemblies
 - 2. Strut coil springs
 - 3. Insulators

- 4. Upper bearing mounts
- C. Steering knuckle assemblies
- D. Torsion bars and mounts
- E. Strut rods
- F. Radius rods
- G. Track bars and trailing arms
- H. Stabilizer bar bushings, brackets, and links
- I. Leaf springs
 - 1. Leaf spring insulators
 - 2. Shackles
 - 3. Brackets
 - 4. Bushings
- J. Shock absorbers
 - 1. Types
 - 2. Mounts
 - 3. Bushings
- K. Lubrication
- V. Wheel Alignment Diagnosis, Adjustment, and Repair
 - A. Pre-alignment inspection and measure
 - B. Ride height
- VI. Wheel and Tires
 - A. Identification
 - B. Wheel/tire vibration, shimmy
 - C. Air pressure loss
 - D. Tire repair methods
 - E. Tire pressure mounting system diagnosis and repair
 - F. Tire inspection, wear patterns, air pressure
 - G. Tire rotation
 - H. Dismounting, inspection, repair and remounting types of tires
 - I. Balance, static and dynamic/ first, second and third order vibration
 - J. Wheel torque and lug nuts

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Describe general principles of steering and suspension.
 - 1. Perform research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
 - 2. Identify methods to disable and enable supplemental restraint system (SRS).
- B. Inspect and describe elements of related suspension and steering service.
 - 3. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
 - 4. Determine proper power steering fluid type; inspect fluid level and condition.
 - 5. Flush, fill, and bleed power steering system.

6. Inspect for power steering fluid leakage; determine necessary action.
 7. Remove, inspect, replace, and adjust power steering pump drive belt.
 8. Inspect and replace power steering hoses and fittings.
 9. Inspect pitman arm, relay (center link/intermediate) rod, idler arm and mountings, and steering linkage damper.
 10. Inspect tie rod ends (sockets), tie rod sleeves, and clamps.
 11. Inspect upper and lower control arms, bushings, and shafts.
 12. Inspect and replace rebound and jounce bumpers.
 13. Inspect track bar, strut rods/radius arms, and related mounts and bushings.
 14. Inspect upper and lower ball joints (with or without wear indicators).
 15. Inspect suspension system cold springs and spring insulators (silencers).
 16. Inspect suspension system torsion bars and mounts.
 17. Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links.
 18. Inspect strut cartridge or assembly.
 19. Inspect front strut bearing and mount.
 20. Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms.
 21. Inspect rear suspension system lead spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts.
 22. Inspect, remove, and replace shock absorbers; inspect mounts and bushings.
 23. Inspect electric power-assisted steering.
 24. Identify hybrid vehicle power steering system electrical circuits and safety precautions.
 25. Describe the function of the power steering pressure switch.
- C. Describe fundamentals of wheel alignment.
26. Perform pre-alignment inspection and measure vehicle ride height; determine necessary action.
- D. Describe and perform wheel and tire service.
27. Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action.
 28. Rotate tires according to manufacturer's recommendations.
 29. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
 30. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
 31. Inspect tire and wheel assembly for air loss; perform necessary action.
 32. Repair tire using internal patch.
 33. Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps.
 34. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.

ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES

Student Handbook

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

College Catalog

<https://www.kckcc.edu/academics/catalog/index.html>

College Policies and Statements

<https://www.kckcc.edu/about/policies-statements/index.html>

Accessibility and Accommodations

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.