SYLLABUS

DATE OF LAST REVIEW: 02/11/2013
CIP CODE: 47.0604
SEMESTER: Departmental Syllabus
COURSE TITLE: Brakes 1
COURSE NUMBER: AUTT0151
CREDIT HOURS: 3
INSTRUCTOR: Departmental Syllabus
OFFICE LOCATION: Departmental Syllabus
OFFICE HOURS: Departmental Syllabus
TELEPHONE: Departmental Syllabus
EMAIL: KCKCC issued email accounts are the official means for electronically communicating with our students.

PREREQUISITE(S): AUTT0101, AUTT0102, or approval from instructor

REQUIRED TEXT AND MATERIALS:
Please see bookstore for current textbook(s) and other required material.

COURSE DESCRIPTION:
In this course students will Perform system pressure and travel calculations utilizing Pascal's Law; Complete service work orders; Determine appropriate system pressure tests utilizing service specifications; Determine brake system concerns and necessary actions; Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; Determine how to inspect, fabricate and/or replace brake lines and hoses; Determine the service specifications pertaining to the removal, cleaning and refinishing procedures on brake drums; Apply drum brake repair and replacement procedures; Diagnose poor stopping noise vibration, pulling, grabbing, dragging or pedal pulsation concerns on disc-brake vehicles; Determine disc brake repair and replacement procedures; Determine how to caliper piston retractions; Diagnose wheel bearing noise, wheel shimmy and vibration concerns; Determine how to remove, inspect and replace bearing and hub assemblies through a variety of classroom and lab/shop learning and assessment activities.

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

**COURSE OUTLINE:**
All students must comply 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.

I. Pressure and travel calculations
   A. Pressure and travel
II. Complete service work orders
   A. Complete work order
      1. Customer information
      2. Vehicle identifying information
      3. Customer concern
      4. Service history
      5. Cause and correction
   B. Research applicable vehicle and service information
      1. Service precautions
      2. Technical service bulletins
   C. Vehicle and major component identification numbers
III. Determine appropriate system pressure tests utilizing service specifications
   A. Diagnosing pressure concerns
   B. Measure brake pedal
      1. Height
      2. Travel
      3. Free play
   C. Leaks
   D. Master cylinder
   E. Diagnose
      1. Poor stopping
      2. Pulling
      3. Dragging concerns
      4. Malfunctions in the hydraulic system
   F. Brake lines
      1. Flexible hoses
      2. Fittings
   G. Brake fluids
   H. Combination valves
   I. Brake warning light
   J. Bleeding and/or flushing
   K. Brake fluid contamination.
IV. Determine brake system concerns and necessary actions
   A. Brake system concerns

V. Diagnose
   A. Poor stopping
   B. Pulling
   C. Dragging

VI. Brake lines and hoses
   A. Damage
   B. Replacing brake lines
   C. Fabrication
   D. Flaring procedures

VII. Brake drums
   A. Measurement
   B. Refinishing

VIII. Drum brake service
   A. Adjustments
   B. Hardware
   C. Wheel cylinders
   D. Backing plates
   E. Self adjusters

IX. Disc brake diagnostics
   A. Noises
   B. Pulling
   C. Dragging
   D. Pulsation
   E. Slides

X. Disc brake repair
   A. Pads
   B. Hardware
   C. Caliper
   D. Lubrication
   E. Rotor
      1. Thickness
      2. Runout
      3. Parallelism

XI. Caliper

XII. Wheel bearings
   A. Preload
   B. Lubrication

XIII. Hub assemblies
   A. Adjust bearings.
   B. Replace wheel bearing and race
   C. Replacing wheel studs
   D. Sealed wheel bearings
EXPECTED LEARNER OUTCOMES:
A. The student will be able to explain system pressure and travel calculations utilizing Pascal's Law
B. The student will be able to summarize service work orders
C. The student will be able to distinguish appropriate system pressure tests utilizing service specifications
D. The student will be able to explain brake system concerns and necessary actions
E. The student will be able to describe poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system
F. The student will be able to explain how to inspect, fabricate and/or replace brake lines and hoses
G. The student will be able to identify the service specifications pertaining to the removal, cleaning and refinishing procedures on brake drums
H. The student will be able to summarize drum brake repair and replacement procedures
I. The student will be able to diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns on disc-brake vehicles
J. The student will be able to describe disc brake repair and replacement procedures
K. The student will be able to explain how to caliper piston retractions
L. The student will be able to describe wheel bearing noise, wheel shimmy and vibration concerns
M. The student will be able to describe how to remove, inspect and replace bearing and hub assemblies

ASSESSMENT OF LEARNER OUTCOMES:
Assessment methods may include, but are not limited to, the following: Homework, Assignments, Quizzes, Class Participation, Chapter Tests, and Final Exam. The grading scale and the process for calculating the course grades are to be determined by the individual instructors. This information will be included in each instructor’s syllabus.

SPECIAL NOTES:
This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student’s progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college’s policy on non-discrimination
be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the Director of the Academic Resource Center in Room 3354 or call (913) 288-7670 V/TDD.

COURSE COMPETENCIES:

The student will be able to explain system pressure and travel calculations utilizing Pascal's Law

1. Use calculations pertaining to system pressure and travel
2. in an instructor provided evaluation tool

The student will be able to summarizer service work orders

3. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
4. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.
5. Locate and interpret vehicle and major component identification numbers.

The student will be able to distinguish appropriate system pressure tests utilizing service specifications

6. Diagnose pressure concerns in the brake system using hydraulic principles.
7. Measure brake pedal height, travel, and free play (as applicable); determine necessary action.
8. Check master cylinder for internal/external leaks and proper operation; determine necessary action.
9. Remove, bench bleed, and reinstall master cylinder.
10. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.
11. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
12. Replace brake lines, hoses, fittings, and supports.
13. Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).
14. Select, handle, store, and fill brake fluids to proper level.
15. Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.
16. Inspect, test, and/or replace components of brake warning light system.
17. Bleed and/or flush brake system.
18. Test brake fluid for contamination.

The student will be able to explain brake system concerns and necessary actions

19. Identify and interpret brake system concern; determine necessary action.
20. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.
21. Locate and interpret vehicle and major component identification numbers.
The student will be able to describe poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system

22. Measure brake pedal height, travel, and free play (as applicable); determine necessary action.
23. Check master cylinder for internal/external leaks and proper operation; determine necessary action.
24. Remove, bench bleed, and reinstall master cylinder.
25. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.
26. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
27. Replace brake lines, hoses, fittings, and supports.
28. Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).
29. Select, handle, store, and fill brake fluids to proper level.
30. Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.
31. Inspect, test, and/or replace components of brake warning light system.

The student will be able to explain how to inspect, fabricate and/or replace brake lines and hoses

32. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
33. Replace brake lines, hoses, fittings, and supports.
34. Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).
35. Select, handle, store, and fill brake fluids to proper level.

The student will be able to identify the service specifications pertaining to the removal, cleaning and refinishing procedures on brake drums

36. Remove, clean, inspect, and measure brake drums; determine necessary action.
37. Refinish brake drum; measure final drum diameter.

The student will be able to summarize drum brake repair and replacement procedures

38. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
39. Inspect, and install wheel cylinders.
40. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings.
41. Install wheel, torque lug nuts, and make final checks and adjustments.

The student will be able to diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns on disc-brake vehicles

42. Diagnose poor stopping, noise, pulling, grabbing, dragging or pulsation concerns; determine necessary action.
43. Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action.
44. Clean and inspect caliper mounting and slides/pins for operation, wear, and damage; determine necessary action.
   The student will be able to describe disc brake repair and replacement procedures.
45. Remove, inspect, and replace pads and retaining hardware; determine necessary action.
46. Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.
47. Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.
48. Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action.
49. Remove and reinstall rotor.
50. Check brake pad wear indicator system operation; determine necessary action.
   The student will be able to explain how to caliper piston retractions.
51. Retract caliper piston on an integrated parking brake system.
   The student will be able to describe wheel bearing noise, wheel shimmy and vibration concerns.
52. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.
   The student will be able to describe how to remove, inspect and replace bearing and hub assemblies.
53. Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.
54. Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.
55. Check parking brake and indicator light system operation; determine necessary action.
56. Check operation of brake stop light system; determine necessary action.
57. Replace wheel bearing and race.
58. Inspect and replace wheel studs.
59. Remove and reinstall sealed wheel bearing assembly.