

SYLLABUS

DATE OF LAST REVIEW: 09/2019

CIP CODE: 47.0603

SEMESTER: Departmental Syllabus

COURSE TITLE: Mechanical and Electrical

COURSE NUMBER: ACRT0180

CREDIT HOURS: 3

INSTRUCTOR: Departmental Syllabus

OFFICE LOCATION: Departmental Syllabus

OFFICE HOURS: Departmental Syllabus

TELEPHONE: Departmental Syllabus

E-MAIL KCKCC issued email accounts are the official means for electronically communicating with our students.

PREREQUISITE(S): ACRT0100

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, <http://www.kckccbookstore.com/>, for the required texts for your particular class.

COURSE DESCRIPTION: Upon completion of this course, the student will have knowledge to inspect and diagnose mechanical problems often related to collision damage. Diagnosis of damaged suspension, cooling system, wheels and tires, brake components, and air conditioning, along with the replacement or repair of these parts are addressed.

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

COURSE OUTLINE

- I. 3.A Suspension and Steering
- II. 3.B Electrical
- III. 3.C Brakes

- IV. 3.D Heating and Air Conditioning
- V. 3.E Cooling Systems
- VI. 3.F Drive Train
- VII. 3.G Fuel, Intake and Exhaust Systems
- VIII. 3.H Restraint Systems

EXPECTED LEARNER OUTCOMES:

- A. The student will be able to determine how to diagnose steering and suspension
- B. The student will be able to diagnose electrical concerns
- C. The student will be able to perform headlamp and fog/driving lamp assemblies and repairs
- D. The student will be able to demonstrate self-grounding procedures for handling electronic components
- E. The student will be able to determine diagnosis, inspection and service needs for brake system hydraulic
- F. The student will be able to examine components of heating and air conditioning systems
- G. The student will be able to determine the inspection, service and repair needs for collision damaged cooling system components
- H. The student will be able to distinguish between the under car components and systems
- I. The student will be able to determine the diagnosis, inspection and service requirements of active and passive restraint systems

COURSE COMPETENCIES:

Upon successful completion of this course the student will demonstrate competence in the classroom or classroom shop setting and by meeting any institution-required NATEF Tasks from the criteria outlined below. NATEF Guidelines of: 95% of HP-I items must be taught in the curriculum; 90% of HP-G items must be taught in the curriculum

The student will be able to determine how to diagnose steering and suspension

(Linked External Standards 3.A Suspension and Steering)

- 1. The student will be able to identify one time use fasteners. (HP-I)(3.A.1)(STE02 modules 1,3)
- 2. The student will be able to remove, replace, inspect or adjust power steering pump, pulleys, belts, hoses, fittings and pump mounts. (HP-G)(3.A.2)(DAM03 v.2.2 module 6 DAM06 module 2 STE03 module 4)
- 3. The student will be able to inspect and adjust (where applicable) steering linkage geometry (attitude/parallelism). HP-G)(3.A.5)(DAM03 v.2.2 module 6 DAM06 module 2 STE03 module 2,3)
- 4. The student will be able to inspect and replace pitman arm. HP-G)(3.A.6)(DAM03 v.2.2 module 6 DAM06 module 2 STE03 module 2)
- 5. The student will be able to inspect and replace relay (center link/intermediate) rod. HP-G) (3.A.7)(DAM03 v.2.2 module 6 DAM06 module 2 STE03 module 2)
- 6. The student will be able to inspect, remove and replace idler arm and mountings. HP-G)(3.A.8)(DAM03 v.2.2 module 6 DAM06 module 2 STE03 module 2)

7. The student will be able to inspect, remove and replace tie rod sleeves, clamps, and tie rod ends. (HP-G) (3.A.9)(DAM03 v.2.2 module 6 DAM06 module 2 STE03 module 2,3)
8. The student will be able to inspect, remove and replace steering linkage damper. (HP-G) (3.A.10)(STE03 module 2)
9. The student will be able to inspect, remove and replace upper and lower control arms. (HP-G) (3.A.11)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 1,2)
10. The student will be able to inspect, remove and replace upper and lower control arm bushings, shafts, and rebound bumpers. (HP-G)(3.A.12) (DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 1)
11. The student will be able to inspect, remove and replace upper and lower ball joints. (HP-G) (3.A.13)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 1)
12. The student will be able to inspect, remove and replace steering knuckle/spindle/hub assemblies (including bearings, races, seals, etc. (HP-G)(3.A.14)(DAM03 v.2.2 module 6 DAM06 module 2 STE01 module 3 STE02 module 1)
13. The student will be able to inspect, remove and replace front suspension system coil springs and spring insulators (silencers). (HP-G)(3.A.15)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 1,3)
14. The student will be able to inspect, remove, replace, and adjust suspension system torsion bars, and inspect mounts. (HP-G)(3.A.16)(STE02 modules 1,3)
15. The student will be able to inspect, remove and replace stabilizer bar bushings, brackets, and links. (HP-G) (3.A.17)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 1)
16. The student will be able to inspect, remove and replace MacPherson strut cartridge or assembly, upper bearing, and mount. (HP-G)(3.A.18)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 1)
17. The student will be able to inspect, remove, and replace rear suspension system transverse links, control arms, stabilizer bars, bushings, and mounts. (HP-G)(3.A.19)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 2)
18. The student will be able to inspect, remove, and replace suspension system leaf spring(s), leaf spring insulators (silencers), shackles, brackets, bushings, and mounts. (HP-G) (3.A.20)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 3)
19. The student will be able to inspect axle assembly for damage and misalignment. (HP-G) (3.A.21)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 1,2)
20. The student will be able to inspect, remove and replace shock absorbers. (HP-G)(3.A.22)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 3)
21. The student will be able to diagnose, inspect, adjust, repair or replace active suspension systems and associated lines and fittings. (HP-G)(3.A.23)(STE05 module 3)
22. The student will be able to inspect, remove, replace, and align front and rear frame (cradles/sub). (HP-G)(3.A.25)(DAM03 module 6)
23. The student will be able to inspect, remove and replace steering shaft U-joint(s), flexible coupling(s), collapsible columns, and steering wheels. (HP-G)(3.A.27)(DAM03 v.2.2 module 6 DAM06 module 2 STE03 module 1)
24. The student will be able to identify toe-out-on-turns (turning radius) related problems; determine needed repairs. (HP-I)(3.A.38)(DAM03 v.2.2 module 6 DAM06 module 2 STE04 module 5)

25. The student will be able to identify SAI (steering axis inclination), included angle, and KPI (king pin inclination) related problems; determine needed repairs. (HP-I) (3.A.39)(DAM03 v.2.2 module 6 DAM06 module 2 STE02 module 1 STE04 module 5)
26. The student will be able to identify thrust angle related problems; determine needed repairs. (HP-I) (3.A.40)(DAM03 v.2.2 module 6 DAM06 module 2 STE04 module 2)
27. The student will be able to Check for front wheel setback; determine needed repairs. (HP-I) (3.A.41)(DAM03 v.2.2 module 6 DAM06 module 2 STE04 module 2)
28. The student will be able to inspect tires, identify direction of rotation and location; check and adjust air pressure. (HP-I)(3.A.43)(DAM03 v.2.2 module 6 DAM06 module 2 STE04 module 2)
29. The student will be able to reinstall wheels and torque lug nuts. (HP-I)(3.A.47)(STE01 module 2)

The student will be able to diagnose electrical concerns
(Linked External Standards 3.B Electrical)

30. The student will be able to inspect, test, and replace fusible links, circuit breakers, and fuses. (HP-I) (3.B.4)(DAM03 module 3 ELE01 module 2)
31. The student will be able to inspect, clean, and replace battery. (HP-I)(3.B.6)(DAM03 module 3 LSC01 module1)
32. The student will be able to dispose of batteries and battery acid according to local, state, and federal requirements. (HP-G)(3.B.7)(LSC01 module1)
33. The student will be able to perform slow/fast battery charge. (HP-I)(3.B.8)(LSC01 module1)
34. The student will be able to check operation of exterior lighting; determine needed repairs. (HP-I) (3.B.12)(LSC01 module 4)
35. The student will be able to inspect, remove and replace power seat, motors, linkages, cables, etc. (HP-G) (3.B.18)(PWR01 module 4)
36. The student will be able to inspect, remove and replace components of electric door and hatch/trunk lock. (HP-G)(3.B.19)(ELE02 module 3 PWR01 module 6)
37. The student will be able to inspect, remove and replace components of keyless lock/unlock devices and alarm systems. (HP-G)(3.B.20)(DAM v.2.4 module 5 PWR01 module 5)
38. The student will be able to inspect, remove and replace components of electrical sunroof and convertible top. (HP-G)(3.B.21)(DAM04 module 2 GLA01 module4)

The student will be able to perform headlamp and fog/driving lamp assemblies and repairs
(Linked External Standards 3.B Electrical)

39. The student will be able to aim headlamp assemblies and fog/driving lamps; determine needed repairs. (HP-I) (3.B.13)(LSC01 module 4)

The student will be able to demonstrate self-grounding procedures for handling electronic components
(Linked External Standards 3.B Electrical)

40. The student will be able to demonstrate the proper self-grounding procedures for handling electronic components. (HP-I)(3.B.24)(ELE02 module 4)

The student will be able to determine diagnosis, inspection and service needs for brake system hydraulic components

(Linked External Standards 3.C Brakes)

41. The student will be able to identify, handle, store, and install appropriate brake fluids; dispose of in accordance with federal, state, and local regulations. (HP-G)(3.C.3)(BRA01 module 1)
42. The student will be able to reinstall wheel and torque lug nuts. (HP-I)(3.C.7)(ABR01 module 2 BRA01 module 2 STE01 module 2)
43. The student will be able to check parking brake system operation. (HP-I)(3.C.10)(ABR01 module 1 BRA01 module 3)
44. The student will be able to identify the proper procedures for handling brake dust. (HP-G)(3.C.13)(BRA01 module 2)
45. The student will be able to check for bent or damaged brake system components. (HP-G)(3.C.14)(ABR01 module 1 BRA01 module 2 DAM03 v.2.2 module 5 DAM03 v.2.4 module 7)

The student will be able to examine components of heating and air conditioning systems

(Linked External Standards 3.D Heating and Air Conditioning)

46. The student will be able to identify and comply with environmental concerns relating to refrigerants and coolants. (HP-G)(3.D.1)(AIR01 module 2,3 HEA01 module 4 WKR01 module 6)
47. The student will be able to locate and identify A/C system service ports. (HP-I)(3.D.3)(AIR01 module 3 DAM03 v.2.2 module 1 DAM03v.2.4 module 2)

The student will be able to determine the inspection, service and repair needs for collision damaged cooling system components

(Linked External Standards 3.E Cooling Systems)

48. The student will be able to check engine cooling and heater system hoses and belts; determine needed repairs. (HP-I)(3.E.1)(DAM03 v.2.2 module 1 DAM03 v.2.4 modules 1,2 HEA01 modules 3,7)
49. The student will be able to inspect, test, remove, and replace radiator, pressure cap, coolant recovery system, and water pump. (HP-G)(3.E.2)(DAM03 module 1 HEA01 module 2)

The student will be able to distinguish between the under car components and systems

(Linked External Standards 3.F Drive Train, 3.G Fuel, Intake and Exhaust Systems)

50. The student will be able to inspect, remove and replace half shafts and axle constant velocity (CV) joints. (HP-G)(3.F.6)(DAM03 v.2.2 module 4 DAM03 v.2.4 module 6 DRT01 module 4)
51. The student will be able to inspect, remove and replace drive shafts and universal joints. (HP-G) (3.F.7)(DAM03 v.2.2 module 4 DAM03 v.2.4 module 6 DRT01 module 4)

52. The student will be able to inspect, remove and replace exhaust pipes, mufflers, converters, resonators, tail pipes, and heat shields. (HP-G)(3.G.1)(DAM03 v.2.2 module 3 DAM04 v.2.4 module 3,6 DRE01 module 1 FUE01 module2)
53. The student will be able to inspect, remove and replace fuel tank, fuel tank filter, fuel cap, fuel filler hose, and inertia switch; inspect and replace fuel lines and hoses; check fuel for contaminants. (HP-G)(3.G.2)(DAM03 v.2.2 module 3 DAM04 v.2.4 module 6 DRE01 module 1 FUE01 module2)

The student will be able to determine the diagnosis, inspection and service requirements of active and passive restraint systems

(Linked External Standards 3.H Restraint Systems)

54. The student will be able to inspect, remove, and replace seatbelt and shoulder harness assembly and components. (HP-G)(3.H.2)(DAM04 module 1 RES01 module 3,4)
55. The student will be able to inspect restraint system mounting areas for damage; repair as needed. (HP-G) (3.H.3)(DAM04 module 1 RES01 module 3)
56. The student will be able to verify proper operation of seatbelt. (HP-G)(3.H.4)(RES01 module3)
57. The student will be able to deactivate and reactivate Supplemental Restraint System (SRS). (HP-G) (3.H.5)(RES01 module 1)
58. The student will be able to inspect, remove and replace Supplemental Restraint Systems (SRS) sensors and wiring; ensure sensor orientation. (HP-G)(3.H.6)(DAM04 module 1 RES01 module 1)
59. The student will be able to verify that Supplemental Restraint System (SRS) is operational. (HP-I) (3.H.7)(RES01 module 2)

ASSESSMENT OF LEARNER OUTCOMES:

Student progress is evaluated by means that include, but are not limited to, exams, written assignments, and class participation.

Attendance: Attendance will be in accordance with the certifying agency's requirements.

SPECIAL NOTES:

Safety: Attendance is critical throughout the safety instructions and quizzes. Students must complete all of the safety training before the student can advance or go on to the next course.

Attendance: Caveats:

1. Safety glasses with side shields are required to be worn during lab activities for this course. This is in compliance with accepted eye protection practices and Kansas State Law (K.S.A. 72-5207). Safety glasses must meet American National Standards Institute Z87.1 specifications. (NOTE: Most prescription eyewear does not meet ANSI Z87.1. Students who wear prescription glasses must: a) Provide evidence that existing eyewear meets ANSI Z87.1, or b) Wear cover goggles (if allowable), or c) Purchase and wear ANSI Z87.1 prescription eyewear.

2. Lab Guidelines: In order to assist with the safe and efficient operation of the automotive lab area, students are expected to be familiar with and adhere to the Automotive Student Lab Guidelines.

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 Rm. 3354 or call at 913-288-7670 V/TDD.

All enrolled students at Kansas City Kansas Community College are subject to follow all rules, conditions, policies and procedures as described in both the Student Code of Conduct as well as the Student Handbook. All Students are expected to review both of these documents and to understand their responsibilities with regard to academic conduct and policies. The Student Code of Conduct and the Student Handbook can be found on the KCKCC website.

