SYLLABUS

DATE OF LAST REVIEW : 02/11/2013
CIP CODE: 47.0604
SEMESTER: Departmental Syllabus
COURSE TITLE: Engine Performance I
COURSE NUMBER: AUTT0181
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, AUTT0161, or approval from instructor

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

COURSE DESCRIPTION:
In this learning plan students will: complete work order and check history; identify engine mechanical integrity; explore the fundamentals of fuel system theory; identify fuel system concerns; explore the fundamentals of ignition theory; identify ignition system concerns; identify induction system concerns; identify exhaust system concerns; identify engine mechanical integrity through a variety of 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. Completing work order and check history
   A. Work orders
   B. Vehicle identification
   C. Customer interview
   D. Service history
   E. Researching vehicle and service information, service precautions
   F. Technical service bulletins
   G. Locating vehicle and major component identification numbers

II. Identification of engine mechanical integrity
   A. Identification and interpretation of engine performance concerns
   B. Inspecting engine assembly for leaks
      1. Fuel
      2. Oil
      3. Coolant
      4. Other leaks.
   C. Abnormal engine noise and vibration
   D. Abnormal exhaust
      1. Color
      2. Odor
      3. Sound
   E. Engine absolute (vacuum/boost) manifold pressure tests
   F. Cylinder power balance tests
   G. Cylinder cranking and running compression tests
   H. Cylinder leakage test
   I. Diagnosing engine concerns
      1. Mechanical
      2. Electrical
      3. Electronic
      4. Fuel
      5. Ignition
   J. Cooling system
      1. Pressure tests
      2. Coolant condition
      3. Radiator
      4. Pressure cap
      5. Coolant recovery tank
6. Hoses
K. Camshaft timing
L. Retrieving and recording diagnostic trouble codes
   1. OBD monitor status
   2. Freeze frame data
   3. Clear codes
   4. Using service information to perform step-by-step diagnosis
M. Inspection and testing crankshaft and camshaft position sensor(s)

III. Identify fuel system concerns
A. Diagnosis of engine
   1. Mechanical
   2. Electrical
   3. Electronic
   4. Fuel
   5. Ignition
B. Use service information
C. Active testing
   1. Actuators
   2. Sensors
D. Diagnosis by symptom.
   1. Hot or cold no-starting
   2. Hard starting
   3. Poor driveability
   4. Incorrect idle speed
   5. Poor idle
   6. Flooding
   7. Hesitation
   8. Surging
   9. Engine misfire
   10. Power loss
   11. Stalling
   12. Poor mileage
   13. Dieseling
   14. Emissions problems
E. Fuel contamination and quality
F. Fuel pump tests
   1. Pump control systems
   2. Pressure
   3. Regulation
   4. Volume
G. Fuel filters
H. Throttle body
I. Air induction
J. Intake manifold
K. Gaskets
L. Vacuum leaks and/or unmetered air
VI. Ignition theory
   A. Primary
   B. Secondary

VII. Ignition system concerns
   A. Testing ignition primary and secondary circuit wiring and solid state components
   B. Ignition coil testing
   C. Crankshaft and camshaft position sensors
   D. Ignition control modules
   E. Powertrain/engine control module; reprogram as necessary.

VIII. Induction systems
   A. Absolute (vacuum/boost) manifold pressure tests
   B. Retrieve and record diagnostic trouble codes
      1. OBD monitor status
      2. Freeze frame data
      3. Clear codes
   C. Use of service information

IX. Identify exhaust system concerns
   A. Exhaust
      1. Color
      2. Odor
      3. Sound

EXPECTED LEARNER OUTCOMES:
   A. The student will be able to complete a work order and check history
   B. The student will be able to identify engine mechanical integrity
   C. The student will be able to explain the fundamentals of fuel system theory
   D. The student will be able to identify fuel system concerns
   E. The student will be able to define the fundamentals of ignition theory
   F. The student will be able to describe ignition system concerns
   G. The student will be able to identify induction system concerns
   H. The student will be able to describe exhaust system concerns

COURSE COMPETENCIES:
   The student will be able to complete work order and check history
   1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction
   2. Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins
   3. Locate and interpret vehicle and major component identification numbers
      The student will be able to identify engine mechanical integrity
   4. Identify and interpret engine performance concern; determine necessary action
5. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action
6. Diagnose abnormal engine noise or vibration concerns; determine necessary action
7. Diagnose abnormal exhaust color, odor, and sound; determine necessary action
8. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action
9. Perform cylinder power balance test; determine necessary action.
10. Perform cylinder cranking and running compression tests; determine necessary action
11. Perform cylinder leakage test; determine necessary action
12. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action
13. Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action
14. Verify correct camshaft timing
15. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable
16. Access and use service information to perform step-by-step diagnosis
17. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action
   *The student will be able to explain the fundamentals of fuel system theory*
18. You will demonstrate your competence:
   in the classroom or shop classroom setting using instructor-provided criterion for evaluation
   *The student will be able to identify fuel system concerns*
19. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action
20. Access and use service information to perform step-by-step diagnosis
21. Perform active tests of actuators using a scan tool; determine necessary action
22. Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action
23. Check fuel for contaminants and quality; determine necessary action
24. Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action
25. Replace fuel filters
26. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air
27. Inspect and test fuel injectors
28. Verify idle control operation
   *The student will be able to define the fundamentals of ignition theory*
29. You will demonstrate your competence:
   in the classroom or shop classroom setting using instructor-provided criterion
for evaluation

The student will be able to describe ignition system concerns

30. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action
31. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable
32. Access and use service information to perform step-by-step diagnosis
33. Perform active tests of actuators using a scan tool; determine necessary action
34. Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action
35. Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action
36. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action
37. Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary

The student will be able to identify induction system concerns

38. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action
39. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable
40. Access and use service information to perform step-by-step diagnosis
41. Perform active tests of actuators using a scan tool; determine necessary action
42. Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action
43. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air
44. Verify idle control operation

The student will be able to describe exhaust system concerns

45. Diagnose abnormal exhaust color, odor, and sound; determine necessary action
46. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action

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.