

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Engine Repair 2
COURSE NUMBER	AUTT-0214
DIVISION	Career and Technical Education
DEPARTMENT	AUTT
CIP CODE	47.0604
CREDIT HOURS	2
CONTACT HOURS/WEEK	Class: 1 Lab: 2
PREREQUISITES	AUTT-0103; AUTT-0213
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) Master Automobile Service Technician (MAST) Program. This course contains a collection of the advanced service procedures for engine repair with emphasis on cylinder head, valve train, engine block, and related component service. This course compliments Engine Repair 1 with continuing service techniques including engine assembly and preparation for first starting. 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 advanced 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. Cylinder Head and Valve Train
 - A. Disassembly
 - B. Valve spring
 1. Height
 2. Squareness
 3. Compression
 - C. Valve stem seals
 1. Head on
 2. Head installed
 - D. Valves
 1. Keepers
 2. Keeper grooves
 3. Spring retainers
 - E. Valve guides
 - F. Stem to guide clearance
 - G. Valve spring installed height
 - H. Valve stem height
 - I. Valve adjustment
 - J. Rocker arms
 - K. Rocker arm stud
 - L. Pushrod
 - M. Warp
 - N. Crack detection
 - O. Vacuum testing
- II. Engine Block
 - A. Block disassembly
 - B. Cleaning
 - C. Measurement
 - D. Inspection
 - E. Crack detection
 - F. Passages
 - G. Core/gallery plugs
 - H. Warp
 - I. Measurements
 - J. Cylinder walls/sleeves
 - K. Ridge wear

- L. Ridge removal
- M. Honing
- N. Deglazing
- O. Camshaft
 - 1. Cam bearings
 - 2. Out of round
 - 3. Taper
- P. Crankshaft
 - 1. Out of round
 - 2. Taper
 - 3. Bearings
 - 4. Endplay
 - 5. Straightness
 - 6. Journal damage
 - 7. Keyway
 - 8. Flange
 - 9. Leveling surface
 - 10. Cracks
 - 11. Crankshaft position reluctor
 - 12. Rod journals
- Q. Piston rods
- R. Piston
- S. Piston rings
- T. Piston pins
- U. Connecting rod alignment
- V. Piston skirts
- W. Ring lands
- X. Piston to bore clearance
- Y. Measure and install piston rings
- Z. Ring gap
- AA. Auxiliary shafts
- BB. Reassemble engine block
- III. Lubrication
 - A. Oil pump types
 - B. Oil pump drives
 - C. Pre-lubrication
 - D. Priming oil pump
 - E. Engine break-in

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Describe cylinder head and valve train service.
 - 1. Inspect valve springs for squareness and free height comparison; determine necessary action.

2. Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine necessary action.
 3. Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action.
 4. Check valve spring assembled height and valve stem height; determine necessary action.
- B. Describe engine block assembly diagnosis and repair.
5. Disassemble engine block; clean and prepare components for inspection and reassembly.
 6. Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action.
 7. Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine necessary action.
 8. Deglaze and clean cylinder walls.
 9. Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.
 10. Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine necessary action.
 11. Inspect main and connecting rod bearings for damage and wear; determine necessary action.
 12. Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine necessary action.
 13. Inspect and measure piston skirts and ring lands; determine necessary action.
 14. Determine piston-to-bore clearance.
 15. Inspect, measure, and install piston rings.
 16. Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance or silencer); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.
 17. Assemble engine block.
- C. Describe lubrication.
18. Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action.

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>.