A. COURSE DESCRIPTION

Credits: 6
Lecture Hours/Week: 3
Lab Hours/Week: 6
OJT Hours/Week: *.*

Prerequisites:
This course requires all three of these prerequisites
AUTO 1000 - Orientation and Safety
AUTO 1010 - General Automotive Service
AUTO 1167 - Vehicle Electronics

Corequisites: AUTO 2130

MnTC Goals: None

This course covers the theory of operation and common service procedures associated with major engine repair. This includes the standard measurements of the cylinder head and block assemblies to determine if machine work is needed, and exploration of how the new engine technology is adapted to hybrid vehicles. (Prerequisites: AUTO 1000, AUTO 1010, and AUTO 1167)(3 credits lecture/3 credits lab)

B. COURSE EFFECTIVE DATES: 01/13/2014 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Engine theory, failure and noise diagnosis
2. Cooling system
3. Intake and exhaust systems
4. Cylinder heads, camshafts and valve trains
5. Timing mechanism
6. Engine block assembly
7. Pistons, rings, connecting rods and bearings
8. Advanced technology vehicles (hybrid, fuel cell, electric, etc.)
D. LEARNING OUTCOMES (General)
   1. Recognize the different engine configurations and types
   2. Identify the difference between two and four cycle engine operation
   3. Describe engine noise and vibration conditions
   4. Explain cooling system operation and diagnosis
   5. Discuss intake and exhaust conditions
   6. Practice grinding valves and seats
   7. Measure and analyze all valve clearances
   8. Describe the relationship among the camshaft lobe design, lift, duration, and overlap
   9. Explain the function of the valve train
  10. Measure and analyze block warpage and cylinder bore diameter
  11. Practice plastic-gauging the crankshaft journals for their oil clearances
  12. Measure and analyze the piston diameters and ring land clearances
  13. List the advantages of piston design
  14. Recognize connecting rod design difference
  15. Discuss the benefits of hybrid vehicles
  16. Restate the differences in series and parallel hybrid systems

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies
   None

F. LEARNER OUTCOMES ASSESSMENT
   As noted on course syllabus

G. SPECIAL INFORMATION
   None noted