A. Course Description
   - Credits: 3.00
   - Lecture Hours/Week: 1.00
   - Lab Hours/Week: 2.00
   - OJT Hours/Week: 0
   - Prerequisites:
     - HCEM 1102: General Shop Mechanics - Introduction
     - HCEM 1140: Diesel Engine Overhaul I
   - Corequisites: None
   - MnTC Goals: None

This course teaches engine tear down, failure analysis, cylinder head repair/major overhaul, and precision measurement instruments on heavy duty equipment. Focusing on brands such as Cat John Deere, Perkins, and Cummins. This course also includes fundamentals of diesel engine design including study of cylinder head and block, lubrication, air intake, exhaust, electrical, cooling, and fuel systems. Major tear down and measuring are included along with preventive maintenance and major repair, tune up and testing on stationary and mobile diesel engines used in heavy equipment industry. Safety and troubleshooting are stressed. Prerequisites: HCEM1102, HCEM1140

B. Course Effective Dates: 8/21/03 – Present

C. Outline of Major Content Areas
   As noted on course syllabus

D. Learning Outcomes
   1. analyze cylinder bore measurements
   2. analyze cylinder head failures
   3. demonstrate ability to estimate cost of repairs
   4. demonstrate professionalism
   5. demonstrate proper torque guidelines
   6. demonstrate removal of pistons, rods and rings
   7. demonstrate shop safety
   8. demonstrate use of correct service manuals and software
9. demonstrate use of specialized tooling and equipment
10. demonstrate use of valve grinding equipment
11. evaluate crankshaft and bearings
12. evaluate cylinder head(s)
13. explain dry sleeve removal and installation techniques
14. explain wet sleeve removal and installation techniques
15. identify engine types
16. perform visual inspection of engine and components
17. use safe work habits
18. write service report(s)

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

F. Learner Outcomes Assessment
   As noted on course syllabus

G. Special Information
   None noted