

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: MOTOR VEHICLE ENGINE SYSTEMS

CODE NO.: MVM111

SEMESTER: 32 Week Program

PROGRAM: MOTOR VEHICLE MECHANIC PRE-APPRENTICE PROGRAM

AUTHOR: JOHN AVERY

DATE: MAY 1997

PREVIOUS OUTLINE DATED: FEBRUARY 1997



DEAN

DATE

TOTAL CREDITS: 3

PREREQUISITE(S): ONTARIO SECONDARY SCHOOL DIPLOMA WITH GRADE 12 ENGLISH AT GENERAL LEVEL AND 1 SENIOR LEVEL HIGH SCHOOL AUTOMOTIVE COURSE OR EQUIVALENT WORK EXPERIENCE.

LENGTH OF COURSE: 32 WEEKS TOTAL CREDIT HOURS: 120

COURSE NAME

CODE NO.

- I. COURSE DESCRIPTION:** This course is designed to provide students with the theoretical understanding of the engine used in motor vehicles. This course will also give the students the practical hands on experience of these engines. The student will be required to perform all of the practical tasks associated with rebuilding an engine.
- H. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**
(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

Upon successful completion of this course the student will demonstrate the ability to:

- 1) Explain the theoretical operation of internal combustion engines; and demonstrate there ability to perform the mechanical repairs associated with repairing the engine and its components.

Potential Elements of the Performance:

- 1) Describe the manner in which engines are classified.
 - 2) Define the engine terminology associated in engine theory.
 - 3) Explain the meaning of horse power, torque and speed.
 - 4) Demonstrate competency in plating performance graphs.
 - 5) Demonstrate the operational theory of two stroke and 4 stroke engines.
 - 6) List the components of the engine.
 - 7) Explain the purpose, construction and operation of the engine components.
 - 8) List the tools required to perform various types of repairs to the engine.
 - 9) Demonstrate his/her ability to properly use and maintain the tools associated with engine rebuilding.
 - 10) Follow manufacturer procedures & specifications found in the appropriate manuals.
- 2) Upon successful completion of this course the student will be able to demonstrate his/her knowledge in diagnosing and servicing the engine sub systems - Lubrication System Service & Repair.

Potential Elements of the Performance:

- 1) Explain the purpose of the lubrication system.
- 2) List the components of the lubrication system.

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**LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE
(Continued)**

- 3) Explain the construction and operation of the components.
- 4) Perform the required shop tests to diagnose problems associated with the lubrication system.
- 5) Perform a proper lubrication service to the engine.
- 6) Repair and replace lubrication components.

3) Sub System - Cooling System Service & Repair

Potential Elements of the Performance:

- 1) Explain the purpose of the cooling system.
- 2) List the components of the cooling system.
- 3) Explain the construction & operation of these components.
- 4) List the test equipment necessary to diagnose and service the cooling system.
- 5) Describe how the testing equipment is used.
- 6) Perform the tasks associated with servicing the cooling system in a safe and environmentally clean manner.
- 7) Perform the tests required to diagnose problems associated with the cooling system.
- 8) Perform the repairs and/or replace the components necessary to fix any problems or defects.
- 9) Demonstrate the ability to find and follow manufacturer specifications.

4) Sub System - Engine Rebuild Service & Procedures

Potential Elements of the Performance:

- 1) Demonstrate the proper method of disassembling an engine in it's entirety.
- 2) Prepare the disassembled engine for cleaning.
- 3) Perform the required measurements necessary to determine the re-use of engine components.
- 4) Install a crankshaft using the proper procedures.
- 5) Check the bearing clearance with plasti-gauge.

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**LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE
(Continued)**

- 6) Record the crankshaft end-play.
- 7) Demonstrate proficiency in servicing and repairing the cylinder head and valves.
- 8) Demonstrate the proper installation of camshaft bearings and camshaft in the engine block.
- 9) Demonstrate the correct method of assembling the pistons, piston rings, and connecting rods.
- 10) Install piston assembly into engine block.
- 11) Install the cylinder head or heads to the engine block using the proper torque values and torquing sequence.
- 12) Prime the engine lubrication system and cooling system prior to engine start up.
- 13) Execute the proper road test of the rebuilt engine.
- 14) Perform the necessary inspection after road testing the vehicle.
- 15) Prepare the vehicle for delivery back to customer.
- 16) Demonstrate the ability to follow the manufacturer suggested specifications.

m. TOPICS:

- 1) Internal combustion engines theory & application
- 2) Engine disassembly & inspection
- 3) Cylinder and Valve train service
- 4) Piston and connecting rod service
- 5) Engine testing & service

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Automotive Text Book & Workbook
Handouts specified to engine rebuilding
Necessary engine rebuilding equipment
Proper testing equipment

V. EVALUATION PROCESS/GRADING SYSTEM

^w The students are required to pass a written test evaluating the theoretical understanding of engines. This test will be worth 50% of the total mark.
There will be a practical test to determine the student ability to perform the rebuilding tasks. This mark shall include shop participation and be worth 50% of the total mark

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VL SPECIAL NOTES:

- Special Needs
If you are a student with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 491 so that support services can be arranged for you.
- Retention of Course Outlines
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other post-secondary institutions.
- Disclaimer for Meeting the Needs of the Learners
- Substitute Course Information is available at the Registrar's Office.
- Any Other Special Notes appropriate to your course.

VH. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following: