HIBBING COMMUNITY COLLEGE
COURSE OUTLINE

COURSE TITLE & NUMBER: ASES 1015: Starting and Charging Systems
CREDITS: 3 (17 Lec / 68 Lab)
PREREQUISITES: Instructor approval.

CATALOG DESCRIPTION:
Starting and Charging Systems covers the theory and operation of starting motors and alternators. This includes the identification of components and electrical circuits used in starting and charging systems. The student services, repairs, and tests these components.

OUTLINE OF MAJOR CONTENT AREAS:
I. Electricity review
   A. Electrical law
   B. Electrical circuits
   C. Circuit diagnosis
II. Starting systems
   A. Design and components
   B. Control circuits
   C. Testing and starter service
III. Charging systems
   A. Design and components
   B. Control circuits
   C. Testing and alternator service
IV. System wiring schematics
V. Test equipment
   A. On-car testing
   B. Diagnosis of various systems

COURSE GOALS/OBJECTIVES/OUTCOMES:
Students will
1. explain volts, amps and ohms.
2. explain voltage drop.
3. perform basic electrical testing.
4. test relay operation.
5. identify electric circuit design.
6. discuss electric circuit problems.
7. demonstrate proper usage of jumper wires, test lights, DVOM and DSO.
8. interpret wiring diagrams.
9. identify circuit protection.

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10. explain starter motor operation.
11. identify starter motor control circuit components.
12. test starter switch.
13. trace starter motor circuits.
14. explain starter circuit tests.
15. perform starter amperage draw test (bench test).
16. perform on-car starter amp draw test.
17. perform insulated circuit voltage drop tests.
18. perform ground circuit voltage drop test.
19. identify cause of high amperage draw.
20. identify cause of low amperage draw.
21. diagnose high voltage drop readings.
22. test starter drive.
23. overhaul starter.
24. replace starter assembly.
25. differentiate no crank and slow crank conditions.
26. inspect and test switches, connectors and wires: determine necessary course of action.
27. explain generator operation.
28. explain voltage regulator function.
29. explain A.C. voltage.
30. explain full-wave rectifier.
31. explain half-wave rectification.
32. test voltage regulator.
33. explain diode function.
34. explain starter function.
35. test battery parasitic drain.
36. test generator output.
37. define “A” and “B” circuits.
38. measure insulated circuit voltage drop.
39. measure ground circuit voltage drop.
40. identify generator rating.
41. diagnose battery overcharge, undercharge and no charge.
42. perform generator overhaul.
43. perform generator bench test.
44. perform on-car charging system test.
45. inspect, adjust or replace drive belts.
46. inspect pulleys, tensioner and belt alignment.
47. replace generator assembly.
48. identify warning lamp circuit.
49. determine i.p. voltmeter function**.**

MNTC GOALS AND COMPETENCIES MET:
N/A

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HCC COMPETENCIES MET:
Working Productively & Cooperatively
Communicating Clearly & Effectively
Thinking Creatively & Critically

STUDENT CONTRIBUTIONS:
The student will be expected to
1. attend all class sessions.
2. participate in class activities and discussions.
3. request assistance when needed.
4. complete and hand in assigned work when due.

Attendance is critical: if the student is not present they cannot participate in or, contribute to the learning process.

STUDENT ASSESSMENT SHALL TAKE PLACE USING INSTRUMENTS SELECTED/DEVELOPED BY THE COURSE INSTRUCTOR.

SPECIAL INFORMATION: (SPECIAL FEES, DIRECTIVES ON HAZARDOUS MATERIALS, ETC.)

AASC APPROVAL DATE: December 18, 2013
REVIEW DATE: December 2018

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