

HIBBING COMMUNITY COLLEGE COURSE OUTLINE

COURSE TITLE & NUMBER: ASES 1023: Basic Electricity and Ignition Systems

CREDITS: 4 (34 Lec/ 68 Lab)

PREREQUISITES: None

CATALOG DESCRIPTION:

Basic Electricity and Ignition Systems covers the theory of electricity and its automotive application. This will include the basic electrical system, theory of operation, and troubleshooting. The ignition system, primary and secondary, will also be covered.

OUTLINE OF MAJOR CONTENT AREAS:

- I. Basic electricity
- II. Electronics introduction
- III. Batteries
 - A. Theory
 - B. Service
- IV. Applied electricity
- V. Four-cycle theory: mechanical testing
- VI. Ignition systems
 - A. Basic circuitry
 - B. Spark timing
 - C. Electronic ignition
 - D. System service
- VII. Engine testing
 - A. Ignition scope
 - B. Lab scope

COURSE GOALS/OBJECTIVES/OUTCOMES:

Students will

1. adjust spark plug gap.
2. analyze spark advance operation.
3. analyze spark plug carbon build up.
4. describe electronic ignition dwell control.
5. describe ignition module operation.
6. describe magnetic line of force.
7. describe magnetic lines of force utilization.
8. describe normal secondary waveform.
9. describe primary ignition operation.
10. describe resistance wires.
11. describe secondary ignition components.
12. describe spark plug operation.
13. explain amperage.

14. explain high impedance.
15. explain resistance.
16. explain voltage.
17. explain distributor cap layout.
18. explain electronic ignition utilization.
19. explain hall effect operation.
20. explain permanent magnet control.
21. explain primary waveform abnormality factors.
22. explain secondary ignition operation.
23. explain secondary waveform abnormality factors.
24. explain silicon dielectric compound.
25. explain spark plug identification code.
26. explain static ignition timing procedure.
27. explain total coil output affects.
28. explain transistor operation.
29. identify primary ignition components.
30. identify primary waveform sections.
31. identify secondary waveform sections.
32. read wiring diagrams.
33. identify piston strokes.
34. define cylinder compression.
35. identify cylinder numbering sequence.
36. define HG vacuum.
37. determine port for manifold vacuum.
38. define Ohm's Law.
39. define transistor.
40. define lead acid storage battery operation.
41. describe basic electron theory.
42. describe dynamic timing setting.
43. identify sparkplug firing kilovolts.
44. illustrate a normal primary waveform.
45. illustrate normal secondary waveform.
46. perform cylinder power balance.
47. perform hall effect test.
48. replace spark plug boot.
49. test dwell section.
50. test coil and condenser operation.
51. test coil voltage output.
52. test general motors module.
53. test magnetic pickup operation.
54. test point close or transistor turn on section.
55. test point open or transistor turn off section.
56. test secondary circuit condition.
57. test spark plug spark duration.
58. apply ignition patterns.
59. test intake manifold vacuum.
60. exhibit safe work practices.
61. identify series/parallel/series parallel.
62. demonstrate series circuit construction.

63. test battery state of charge.
64. demonstrate parallel circuit construction.
65. perform battery load test.
66. check for battery drain.
67. perform voltage test.
68. perform voltage drop test.
69. perform amperage test.
70. perform resistance test.
71. check cranking vacuum.
72. test ignition module inputs.
73. measure secondary wire resistance.
74. perform static ignition timing.
75. test ignition module outputs.
76. rewire distributor cap.
77. set ignition timing (with timing lite).
78. repair spark plug wire.
79. perform battery capacity test.

The instructor may deviate from the above list to meet industry changes or due to time and space availability.

MNTC GOALS AND COMPENTENCIES MET:

N/A

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. perform assigned tasks.
4. request assistance when needed.

**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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