NIDA CORPORATION
COMPUTER ASSISTED INSTRUCTION

LESSON AND OBJECTIVE LISTING

Master Course Listing
Automotive

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Representative
Technology Education Concepts
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OBJECTIVE LISTING - Master Course Listing

LESSON ID/TITLE — CARDS/KITS

MOD 61 - INTRODUCTION TO VEHICLE TECHNOLOGY

7021-112-130 Introduction to the Automobile . . . . . ---
- Understand the history of the automobile.
- Identify 9 of the many automobile systems.
- Identify careers associated with the automobile.

7021-112-160 Electrical Systems . . . . . ---
- Identify an automobile battery.
- Identify devices of the automobile.
- Understand how the devices get electrical energy from the battery.
- Understand that a computer can control some systems of the automobile.

7021-112-190 Charging and Ignition Systems . . . . . ---
- Understand how the alternator works to recharge the battery.
- Understand how the ignition coil works to ignite the fuel in the engine.

7021-112-220 Fuel Systems . . . . . ---
- Understand how a carburetor functions.
- Understand how fuel injection functions.
- Understand how a turbocharger functions.

7021-112-250 Engines . . . . . ---
- Identify basic engine parts.
- Understand how the engine functions.
- Understand how engines are classified.

7021-112-280 Cooling Systems . . . . . ---
- Identify the parts of the automobile's cooling system.
- Understand the function of the cooling system.

7021-112-310 Hydraulic Systems . . . . . ---
- Understand the automobile's braking system.
- Understand the automobile's power steering system.

7021-112-340 Air Conditioning and Heating Systems . . . . . ---
- Identify the major parts of the air conditioning system.
- Understand how the air conditioning system functions.
- Identify the parts of the heating system.
- Understand how the heating system functions.

7021-112-370 Drive Train and Suspension . . . . . ---
- Identify the parts of the drive train.
- Understand the function of the drive train.
- Identify the parts of the suspension.
- Understand the function of the suspension.

7021-112-400 Body Design . . . . . ---
- Identify the automobile body parts.
- Understand the function of the automobile body parts.
- Identify the different options of an automobile.
- Understand the capabilities of each option.

7021-112-920 Introduction to Vehicle Technology Post-Test (Theory) . . . . . ---

MOD 62 - INTRODUCTION TO AUTOMOTIVE ELECTRICITY

7021-212-130 Automotive Safety . . . . . ---
- Identify safety habits associated with electrical and other equipment.

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MOD 62 - INTRODUCTION TO AUTOMOTIVE ELECTRICITY (cont.)

7021-212-130 Automotive Safety (cont.)
- ▪ Identify hazards associated with the automobile.

7021-212-160 Metric Notation . . . . . ---
- ▪ Convert decimal numbers to powers of ten and vice versa.
- ▪ Convert decimal numbers to metric prefixes and vice versa.
- ▪ Add, subtract, multiply, and divide powers of ten.
- ▪ Add, subtract, multiply, and divide metric prefixes.

7021-212-190 Voltage, Current, and Resistance . . . . . ---
- ▪ Describe an atom and its structure.
- ▪ Define electric charge as it relates to electrons and protons.
- ▪ Describe the law of electrostatic forces.
- ▪ Define voltage and the volt as a unit of voltage.
- ▪ Define the relationship between voltage and potential difference.
- ▪ Define current and the ampere as the unit of current.
- ▪ Describe a conductor and the behavior of electrons within a conductor.
- ▪ Describe an insulator and the behavior of electrons within an insulator.
- ▪ Identify the purpose of a resistor.
- ▪ Identify the unit of resistance as the ohm.

7021-212-220 Switches and Protective Devices . . . . . ---
- ▪ Identify the purpose of a switch.
- ▪ Identify switch schematic symbols.
- ▪ Describe single and double pole.
- ▪ Describe single and double throw.
- ▪ Identify the purpose of protection devices.
- ▪ Identify a fuse and a circuit breaker.
- ▪ Identify schematic symbols for fuses and circuit breakers.
- ▪ Identify a fusible link.

7021-212-920 Introduction to Automotive Electricity Post-Test (Theory) . . . . . ---

MOD 63 - AUTOMOTIVE TEST EQUIPMENT

7021-214-130 Introduction to Multimeters . . . . . ---
- ▪ Describe the purpose of a multimeter.
- ▪ Identify the quantities measured by multimeters.
- ▪ Identify two types of multimeter displays.
- ▪ Describe the four functional sections of the multimeter.
- ▪ Describe the purpose of each functional section.

7021-214-160 Multimeter Use 701
- ▫ Understand the operation of a digital multimeter.
- ▫ Understand the steps to make a proper measurement using a digital multimeter.

7021-214-190 Voltage Measurements 701
- ▪ Describe how to set up a multimeter to measure voltage.
- ▪ Describe how to read a multimeter's display when measuring voltage.
- ▪ Identify the precautions to observe when making voltage measurements.
- ▫ Perform voltage measurements using a digital multimeter.

7021-214-220 Current Measurements 701
- ▪ Describe how to set up a multimeter to measure current.

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MOD 63 - AUTOMOTIVE TEST EQUIPMENT (cont.)

7021-214-220 Current Measurements (cont.)
- ▪ Describe how to read a multimeter's display when measuring current.
- ▪ Identify the precautions to observe when making current measurements.
- ▫ Perform current measurements using a digital multimeter.

7021-214-250 Resistance Measurements 708
- ▪ Describe how to set up a multimeter to measure resistance.
- ▪ Describe how to read a multimeter's display when measuring resistance.
- ▪ Describe the precautions to observe when making resistance measurements.
- ▪ Define power rating.
- ▪ Define tolerance.
- ▪ Identify number/letter codes.
- ▫ Perform resistance measurements.

7021-214-280 Introduction to the Oscilloscope 707, 708
- ▪ Describe the purpose of an oscilloscope.
- ▪ Identify the quantities measured by an oscilloscope.
- ▪ Describe single trace and dual trace oscilloscopes.
- ▪ Identify the four major functional sections.
- ▪ Describe the purpose of each control and switch.
- ▫ Set up an oscilloscope for normal operation.
- ▫ Use an oscilloscope to analyze a waveform.
- ▫ Measure voltage using an oscilloscope.

7021-214-920 Automotive Test Equipment Post-Test (Theory) . . . . . ---

MOD 64 - BASIC ELECTRICAL DC AND AC

7021-216-130 Ohm's Law and Power 701
- ▪ Define Ohm's Law and describe how voltage, current, and resistance are related.
- ▪ Define power and describe how voltage, current, and Ohm's Law are related to power.
- ▫ Prove the Ohm's Law relationship of voltage, current, and resistance.

7021-216-160 Series Circuits and the Automobile 702
- ▪ Identify a simple series circuit.
- ▪ Understand basic principles of a series circuit.
- ▪ Verify that Ohm's Law applies to series circuits.
- ▫ Observe a working series circuit.
- ▫ Verify basic principles of a series circuit.

7021-216-190 Parallel Circuits 703
- ▪ Identify a parallel circuit.
- ▪ Recognize that the applied voltage is the same across each branch.
- ▪ Calculate current in each branch of a parallel circuit.
- ▪ Calculate total current from the sum of the individual branches of a parallel circuit.
- ▪ Calculate total resistance in a parallel circuit.
- ▫ Measure the applied voltage across each branch in a parallel circuit.
- ▫ Measure resistance in a parallel circuit.
- ▫ Measure current in a parallel circuit.

7021-216-220 Series-Parallel Circuits 704
- ▪ Identify a series-parallel circuit.
- ▪ Calculate total resistance in a series-parallel circuit.

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MOD 64 - BASIC ELECTRICAL DC AND AC (cont.)

7021-216-220 Series-Parallel Circuits (cont.)
- ▪ Calculate current in a series-parallel circuit.
- ▪ Calculate voltage drops in a series-parallel circuit.
- ▫ Measure resistance values in a series-parallel circuit.
- ▫ Measure current values in a series-parallel circuit.
- ▫ Measure voltage drops in a series-parallel circuit.

7021-216-250 Voltage Divider Circuits 705
- ▪ Identify a voltage divider circuit.
- ▪ Identify a voltage divider as loaded or unloaded.
- ▪ Calculate loaded and unloaded voltage divider current, voltage, and resistance values.
- ▪ Calculate % regulation for a voltage divider circuit.
- ▫ Identify and measure various characteristics of a voltage divider circuit.

7021-216-280 Relay Operation 706
- ▪ Describe the purpose and type of relays.
- ▪ Describe basic relay construction and operation.
- ▪ Describe the latched and time delay relay.
- ▫ Observe basic relay operation.
- ▫ Observe characteristics of a basic relay circuit.

7021-216-310 Alternating Current . . . . . ---
- ▪ Define alternating current.
- ▪ Identify an AC sine wave.
- ▪ Define frequency and cycle.
- ▪ Describe hertz.
- ▪ Determine the wavelength of a sine wave.
- ▪ Determine the period of a sine wave.

7021-216-340 Magnetism, Relays, and Meters . . . . . ---
- ▪ Define magnetism.
- ▪ Identify characteristics of magnets.
- ▪ Define laws of magnetic attraction and repulsion.
- ▪ Describe properties of magnetic lines of force.
- ▪ Define electromagnetism.
- ▪ Identify the characteristics of electromagnets.
- ▪ Describe the operation of a relay.
- ▪ Describe the operation of a magnetic circuit breaker.
- ▪ Describe the operation of a meter.

7021-216-400 Automotive Troubleshooting I 702, 703, 704
- ▫ Recognize normal operation of a series circuit.
- ▫ Observe and isolate faults in a series circuit.
- ▫ Recognize normal operation of a parallel circuit.
- ▫ Observe and isolate faults in a parallel circuit.
- ▫ Recognize normal operation of a series-parallel circuit.
- ▫ Observe and isolate random faults.

7021-216-920 Basic Electrical DC and AC Post-Test (Theory) . . . . . ---

MOD 65 - BASIC ELECTRONICS FOR AUTOMOTIVE

LESSON ID/TITLE CARDS/KITS

MOD 65 - BASIC ELECTRONICS FOR AUTOMOTIVE (cont.)

LESSON ID/TITLE CARDS/KITS

MOD 65 - BASIC ELECTRONICS FOR AUTOMOTIVE (cont.)

7021-218-340 Introduction to Combinational Circuits 713B
- ▪ Define combinational logic.
- ▪ Describe the uses of combinational logic.
- ▪ Trace inputs through a combinational logic circuit.
- ▪ Describe the universal property of the NAND gate.
- ▪ Describe the universal property of the NOR gate.
- ▫ Analyze the operation of a combinational circuit.

7021-218-400 Automotive Troubleshooting II 706, 707, 708
- ▫ Recognize normal operation of a relay circuit.
- ▫ Observe and isolate a faulted relay circuit.
- ▫ Recognize normal operation of a diode circuit.
- ▫ Observe and isolate a fault in a diode circuit.
- ▫ Recognize normal operation of an inductive circuit.
- ▫ Observe and isolate random faults.

7021-218-920 Basic Electronics for Automotive Post-Test (Theory) . . . . . ---

MOD 66 - BASIC AUTOMOTIVE SYSTEMS

7021-312-130 Turn Signal Systems 714
- ▪ Describe the use of the turn signal.
- ▪ Examine the characteristics of turn signals.
- ▫ Examine the operation of a turn signal system.

7021-312-160 Starting Systems 715
- ▪ Describe the use of the starting system.
- ▪ Examine the characteristics of different starting system components.
- ▫ Examine the operation of a starting system.

7021-312-190 Ignition Systems 707, 709
- ▪ Identify the components of a Distributor Ignition System.
- ▪ Identify the types of ignition systems.
- ▪ Identify the components of a Distributorless Ignition System.
- ▪ Identify the benefits of Distributorless Ignition Systems.
- ▫ Describe the operation of mechanical and electronic switching circuits.

7021-312-220 Charging Systems 708
- ▪ Identify the components of a charging system.
- ▪ Describe the characteristics of charging systems.
- ▫ Examine the operation of diodes in a charging system.

7021-312-250 Fuel Injection 716
- ▪ Describe the use of fuel injection.
- ▪ Examine the characteristics of different types of fuel injection.
- ▫ Examine the operation and timing of fuel injection in an automobile.

7021-312-280 Engine Cooling and Climate Control 713A
- ▪ Identify the purpose of the engine's cooling system.
- ▪ Describe the operation and construction of an engine's cooling system.
- ▪ Describe the operation and construction of the cooling system's components.
- ▪ Describe the operation of electrical circuits used to control the cooling system.
- ▪ Identify the purpose of the environmental climate control system.
- ▪ Describe the operation and construction of an environmental climate control system.

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MOD 66 - BASIC AUTOMOTIVE SYSTEMS (cont.)

7021-312-280 Engine Cooling and Climate Control (cont.)

- ▪ Describe the operation and construction of the environmental climate control system components.
- ▪ Describe the operation of electrical circuits used to control the climate control system.
- ▫ Observe the operation of the circulating fan circuit in the air conditioning and engine cooling system.
- ▫ Identify the faulty operation of the circulating fan circuit in the air conditioning and engine cooling system.

7021-312-400 Automotive Troubleshooting III 713A, 714, 715

- ▫ Recognize normal operation of AC and cooling fans.
- ▫ Observe and isolate a faulted AC and cooling fan system.
- ▫ Recognize normal operation of a blinker system.
- ▫ Observe and isolate a fault in a blinker system.
- ▫ Recognize normal operation of an inductive circuit.
- ▫ Observe and isolate random faults.

7021-312-920 Basic Automotive Systems Post-Test (Theory) . . . . . ---

MOD 67 - AUTOMOTIVE APPLICATIONS

7021-314-130 Trailer Wiring 720, 721

- ▪ Understand the kinds of problems associated with trailer wiring.
- ▪ Understand the process of troubleshooting trailer wiring.
- ▪ Describe the types of test instruments used to troubleshoot trailer wiring.
- ▪ Define a short circuit.
- ▪ Define an open circuit.
- ▫ Perform a basic wiring exercise including continuity and acceptance testing.
- ▫ Recognize common malfunctions in trailer lighting systems.

7021-316-130 Car Audio Systems . . . . . ---

- ▪ Identify the components that make up a car audio system and describe their function.
- ▪ Identify various car audio system components that adjust certain properties of the sound.
- ▪ Identify the components that increase the sound level and convert the electrical signals to audible sound.
- ▪ Understand the proper way to wire the audio system.

7021-316-160 Car Audio Design and Installation . . . . . CAS1, CAS2, CAS3, CAS4(3)

- ▪ Describe the steps in designing a car audio system.
- ▪ Determine the basic tools needed in order to upgrade a car audio system.
- ▪ Understand the installation procedures.
- ▫ Design an audio system by laying out all audio devices in a functional way.
- ▫ Install the audio system by measuring the proper lengths of wire and connecting the devices correctly.

7021-316-920 Automotive Technology Car Audio Post-Test (Theory) . . . . . ---

MOD 68 - AUTOMOTIVE CAN BUS

7021-412-130 CAN Bus Familiarization . . . . . TS101 Set

- ▪ Examine CAN bus basics.
- ▪ Describe CAN bus specifications.
- ▪ Examine CAN bus automotive applications.

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MOD 68 - AUTOMOTIVE CAN BUS (cont.)

7021-412-130 CAN Bus Familiarization (cont.)
- ▪ Describe OBDII error codes.
- ▫ Test and confirm normal operation of a CAN bus system.
- ▫ Perform measurements on the CAN bus circuitry.
- ▫ Confirm normal operation of a CAN bus system.
- ▫ Troubleshoot CAN bus circuitry.

7021-412-160 CAN Bus Power Distribution . . . . . TS101 Set
- ▪ Examine CAN bus power distribution basics.
- ▫ Test and confirm normal operation of CAN bus power distribution circuitry as part of the CAN bus system.
- ▫ Perform measurements on the CAN bus power distribution circuitry.
- ▫ Confirm the normal operation of CAN bus power distribution circuitry.
- ▫ Troubleshoot CAN bus power distribution circuitry.

7021-412-190 CAN Bus Engine . . . . . TS101 Set
- ▪ Examine CAN bus engine basics.
- ▫ Test and confirm normal operation of CAN bus engine circuitry as part of the CAN bus system.
- ▫ Perform measurements on the CAN bus engine circuitry.
- ▫ Confirm the normal operation of CAN bus engine circuitry.
- ▫ Troubleshoot CAN bus engine circuitry.

7021-412-220 CAN Bus Transmission . . . . . TS101 Set
- ▪ Examine CAN Bus transmission basics.
- ▫ Test and confirm normal operation of CAN bus transmission circuitry as part of the CAN bus system.
- ▫ Perform measurements on the CAN bus transmission circuitry.
- ▫ Confirm the normal operation of CAN bus transmission circuitry.
- ▫ Troubleshoot CAN bus transmission circuitry.

7021-412-250 CAN Bus Lighting-Security . . . . . TS101 Set
- ▪ Examine CAN Bus lighting and security basics.
- ▫ Test and confirm normal operation of CAN bus lighting and security circuitry as part of the CAN bus system.
- ▫ Perform measurements on the CAN bus lighting and security circuitry.
- ▫ Confirm the normal operation of CAN bus lighting and security circuitry.
- ▫ Troubleshoot CAN bus lighting and security circuitry.

7021-412-280 CAN Bus ABS/ESC/TC . . . . . TS101 Set
- ▪ Examine CAN Bus ABS/ESC/TC basics.
- ▫ Test and confirm normal operation of CAN bus ABS/ESC/TC circuitry as part of the CAN bus system.
- ▫ Perform measurements on the CAN bus ABS/ESC/TC circuitry.
- ▫ Confirm the normal operation of CAN bus ABS/ESC/TC circuitry.
- ▫ Troubleshoot CAN bus ABS/ESC/TC circuitry.

7021-412-920 Automotive Technology - CAN Bus Post-Test (Theory) . . . . . ---

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