

MARTIN COMMUNITY COLLEGE

COURSE SYLLABUS

Semester/Year: Spring 2011

COURSE NUMBER:	AUT 163 (01)	INSTRUCTOR:	Queracus Rodgers
COURSE TITLE:	Advanced Auto Electricity	OFFICE NO:	Building 3, Room 7
CREDIT HOURS:	3	OFFICE/VIRTUAL HOURS:	MT 8-10, Th 8-9,M 12-2, F 11-12
CONTACT HRS/WK:	5 (2 class, 3 lab)	PHONE NO:	(252) 789-0212
PREREQUISITES:	AUT 161	FAX:	(252)792-0826
COREQUISITES:	None	E-MAIL:	qrodgers@mcc.martincc.edu

COURSE DESCRIPTION: This course covers electronic theory, wiring diagrams, test equipment, and diagnosis, repair, and replacement of electronics, lighting, gauges, horn, wiper, accessories and body modules. Topics include networking and module communication, circuit construction, wiring diagrams, circuit testing, and troubleshooting. Upon completion, students should be able to properly use wiring diagrams, diagnose, test and repair wiring, lighting, gauges, accessories, modules and electronic concerns.

PROGRAM LEARNING OUTCOMES:

Upon successful program completion, the student shall be able to:

1. Inspect, diagnose, disassemble, repair, replace and service each of the basic systems in various types of vehicles to a NATEF (National Automotive Technician Education Foundation) standard.
2. Inspect, diagnose, disassemble, repair, replace and service each of the advanced systems in various types of vehicles to a NATEF (National Automotive Technician Education Foundation) standard.
3. Demonstrate knowledge and understanding of automotive systems to a level at, or above that required for ASE (National Institute for Automotive Service Excellence) certification in general automotive service.

COURSE LEARNING OUTCOMES:

Upon successful program completion, the student shall be able to:

1. Discuss the electrical system function, construction and diagnosis.
2. Explain network and controller functions and diagnostics.
3. Diagnose and repair electronic vehicle system issues using appropriate test equipment and service information.

NATEF OBJECTIVES:

A. General Electrical System Diagnosis

1. Identify and interpret electrical/electronic system concern; determine necessary action. P-1
2. Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins. P-1
3. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals). P-1
4. Diagnose electrical/electronic integrity for series, parallel and series-parallel circuits using principles of electricity (Ohm's Law). P-1
5. Use wiring diagrams during diagnosis of electrical circuit problems. P-1
6. Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems. P-1
7. Check electrical circuits with a test light; determine necessary action. P-2
8. Measure source voltage and perform voltage drop tests in electrical/electronic circuits using a voltmeter; determine necessary action. P-1
9. Measure current flow in electrical/electronic circuits and components using an ammeter; determine necessary action. P-1
10. Check continuity and measure resistance in electrical/electronic circuits and components using an ohmmeter; determine necessary action. P-1
11. Check electrical circuits using fused jumper wires; determine necessary action. P-2
12. Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action. P-1
13. Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action. P-1
14. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. P-1
15. Inspect and test switches, connectors, relays, solid state devices, and wires of electrical/electronic circuits; perform necessary action. P-1
16. Repair wiring harnesses and connectors. P-1
17. Perform solder repair of electrical wiring. P-1

VI. ELECTRICAL/ELECTRONIC SYSTEMS

F. Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair

1. Inspect and test gauges and gauge sending units for cause of intermittent, high, low, or no gauge readings; determine necessary action. P-1
2. Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action. P-3
3. Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action. P-1
4. Inspect and test sensors, connectors, and wires of electronic instrument circuits; determine necessary action. P-2

VI. ELECTRICAL/ELECTRONIC SYSTEMS

G. Horn and Wiper/Washer Diagnosis and Repair

1. Diagnose incorrect horn operation; perform necessary action. P-2
2. Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action. P-2
3. Diagnose incorrect washer operation; perform necessary action. P-2

VI. ELECTRICAL/ELECTRONIC SYSTEMS

H. Accessories Diagnosis and Repair

1. Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action. P-2
2. Diagnose incorrect heated glass operation; determine necessary action. P-3
3. Diagnose incorrect electric lock operation; determine necessary action. P-2
4. Diagnose incorrect operation of cruise control systems; determine necessary action. P-3
5. Diagnose supplemental restraint system (SRS) concerns; determine necessary action. (Note: Follow manufacturer's safety procedures to prevent accidental deployment.) P-2
6. Disarm and enable the airbag system for vehicle service. P-1
7. Diagnose radio static and weak, intermittent, or no radio reception; determine necessary action. P-3
8. Remove and reinstall door panel. P-1
9. Diagnose body electronic system circuits using a scan tool; determine necessary action. P-2
10. Check for module communication errors using a scan tool. P-3

11. Diagnose the cause of false, intermittent, or no operation of anti-theft system. P-2

REQUIRED TEXTBOOKS:

Text: NORTH AMERICAN OPERATIONS (1998) Electrical/Electronics 18003 (1st ed.) Warren: General Motors Corporation. ISBN: NA

SUPPLEMENTAL RESOURCES:

Required Supplies: Approved Safety Glasses

Basic Tool Set (See Attached)

NOTE: SAFETY GLASSES ARE REQUIRED TO BE WORN AT ALL TIMES WHILE IN THE SHOP AREA AND IN THE OUTSIDE WORK AREA

Reference Materials: Information on Shop-Key discs; and videos from manufactures; on new up-date engines.

LEARNING/TEACHING METHODS: Lecture, VHS tapes, textbooks and various manufacturers' specifications and repair manuals, outside reading assignments, hands-on lab

Evaluation:

Grading will be based on a minimum of one (1) weekly test, a final exam and lab work and outside reading assignment.

Classroom	20%
Shop	20%
Tests	20%
Outside Reading Assignments	15%
Final Exam	25%

(Determined by quality of work done, quantity of work and dependability in completing job tasks.)

A=90-100 B=80-89 C=70-79 D=60-69 F=59 and

COURSE OUTLINE:

Week 1: Electricity Overview/Definitions

Week 2: Batteries/Generators

Week 3: Circuits

Week 4: Symbols

Week 5: Properties of electricity

Week 6: Digital Multi Meter (DMM)

Week 7: Ohm's Law

Week 8: Circuit Elements

Week 9: Basic Circuit Theory

Week 10: Series Circuits

Week 11: Parallel Circuits

Week 12: Series-Parallel Circuits

Week 13: Circuit Faults

Week 14: Electro-magnetic Induction

Week 15: EMI testing

Week 16: Lab Clean-up and Review

STUDENT ATTENDANCE POLICY:

Martin Community College recognizes that academic success is tied to regular attendance and completion of assigned work and tasks in a timely manner. Students are expected to attend a minimum of 80 percent of the total hours in this course, which includes classes, labs. Students must be present in at least one class during the first ten percent (10%) of a course in order to be considered enrolled in the class. If a student has not attended at least one class by the ten percent census date, the instructor will administratively withdraw the student.

Students who miss more than six contiguous contact hours or fail to attend the required percentage of total hours without a justifiable absence and verifiable contact with the instructor may be administratively withdrawn from the class and given a grade of "WF." The "WF" will be equivalent to an "F" when calculated into the student's GPA. An absence MAY, the instructor's sole discretion, be considered justifiable if proper, verifiable documentation of medical emergency is supplied. Verifiable contact will consist exclusively of a email to the instructor with an instructor reply and/or a registered/return-receipt letter to the instructor. Students may remove a "WF" by submitting appropriate paperwork for an official withdrawal by the last day to officially withdraw without receiving an "F." The last day to officially withdraw without receiving an "F" is published in the academic calendar for each academic year.

Make-up work will be allowed only with written prior approval of the instructor.

Habitual tardiness and/or early departure in a course will be considered in computing class attendance. A student will be considered tardy if they are not in their seat and prepared for work at the published class starting time. Students will be considered absent if not present when the roll is taken. Students may enter the classroom after the after the published class starting time if they can do so without disruption. It is the student's responsibility at the end of class or first break to make the instructor aware of their presence and arrival time. Students failing to do this will be considered absent for the entire class period. Early departure will be considered any time the student is absent from class for more than 5 minutes per class hour without direct instructor permission. Students departing more than 5 minutes before the published class ending time without prior instructor approval will be considered absent for the entire class period.

Students will be counted absent from the date they register for each course.

Note: Under DVA regulations, the enrollment of veterans or dependents will be terminated or adjusted if they are administratively withdrawn or if they officially withdraw.

If an instructor fails to report for a class within 15 minutes of the scheduled beginning time and has not left instructions, those students present should sign a sheet before leaving and designate a student to submit it to the Dean of Academic Affairs and Student Services.

REQUEST FOR EXCUSED ABSENCES FOR RELIGIOUS OBSERVANCES

In compliance with G.S. 115D-5, MCC policy permits a student to be excused, with the opportunity to make-up any test or other missed work, a minimum of two excused absences per academic year for religious observances required by the student's faith.

The policy limits the excused absences to a maximum of two days per academic year.

Students who wish to be excused for a Religious Observance required by their faith must complete and submit a request form to the instructor(s) prior to the census date of each class. The ***Request for Excused Absences for Religious Observances*** form can be picked up from Student Services. This does not supersede the college-wide attendance policy as outlined in the college catalog or syllabus, with the exception of a reasonable accommodation for the make-up of missed course work.

COURSE POLICIES: Eating/Drinking not allowed in classroom or Laboratory.

If you cannot reach your instructor, you may contact Dr. Phyllis Broughton, Dean of Academic Affairs, (252) 792-1521 ext. 247 by phone, pbroughton@martincc.edu by e-mail, or in person at her office in Building 2, Room 2.

If you have a need for a disability-related accommodation, please notify the Student Services counselor at (252) 792-1521, ext. 293.

**Recommended Minimum Tool List
MARTIN COMMUNITY COLLEGE
AUTOMOTIVE SYSTEMS TECHNOLOGY**

DISCRIPTION	“SUCH AS”
Tool Chest, 8 Drawer	Sears 9-65248
½” Drive Torque Wrench 20-150 lb/ft	Sears 9-44595
Telescoping Inspection Mirror	Sears 9-40931
Brake Retainer Spring tool	Sears 9-47761
Magnetic Pick-up tool	Sears 9-0413
12 volt test light	KD Tools #126
Flashlight, 2 AA, Focusable beam	Mag Instruments “Mini-mag”
10” Mill Bastard file	Sears 9-31257
File handle	
16 oz Ball Peen hammer	Sears 9-38465
16 oz Rubber Mallet	Sears 9-45787
Scratch Awl	Sears 941028
1 inch Gasket Scraper	Sears 9-43292
12 in. square frame hacksaw	Klein 701-S
2, 12 in 24TPI hacksaw blades	Sears 9-36046
2, 12 in 32 TPI hacksaw blades	Sears 9-36049
25 in Pry Bar	Sears 9-43277
TORX™ Screwdrivers T10,T15,T20,T27,T30	Sears 9-4140
Screwdriver, Slotted 1/8 x 4	Sears 9-41589
Screwdriver, Slotted 3/16/ x 4	Sears 9-41581
Screwdriver, Slotted ¼ x 4	Sears 9-41583
Screwdriver, Slotted ¼ x 6	Sears 9-41584
Screwdriver, Slotted 3/16 x 8	Sears 9-41248
Screwdriver, Slotted 3/8 x 8	Sears 9- 41852
Screwdriver, Phillips #1 x3	Sears 9-41294
Screwdriver, Phillips #2 x 4	Sears 9-41295
Screwdriver, Phillips #1 x 1 1/2	Sears 9-418.55
Screwdriver, Phillips #2 x 1.5	Sears 9-04118
Screwdriver, Phillips #2 x 8	Sears 9-41296
Screwdriver, Phillips # 3 x 6	Sears 9-41297
Wrench set, Combination, SAE 1/4 in. to 15/16 in	Sears 9- 46893
Wrench set, Combination, METRIC 7mm to 17mm	Sears 9- 46894
Socket set, 3/8 Drive 6 pt. SAE 5/16-11/16	Sears 9-34437
Socket set, 3/8 Drive 6 pt. Metric 8-17 mm	Sears 9-34441
Socket set, 3/8 Drive 6 pt. SAE deep 5/16-11/16	Sears 9-34439
Socket set, 3/8 Drive 6 pt. Metric deep 8-17 mm	Sears 9-34443
Ratchet, 3/8 Drive	Sears 9-44808
Ratchet, 1/2 Drive	Sears 9-44809
Extension, 3/8 Drive 3”	Sears 9-44264
Extension, 3/8 Drive 6”	Sears 9-44261
Extension, 3/8 Drive 10”	Sears 9-44262

Extension, 1/2 Drive 3"	Sears 9-44133
Extension, 1/2 Drive 6"	Sears 9-44131
Extension, 1/2 Drive 10"	Sears 9-44132
Flex Handle, 10 inch 3/8 Drive	Sears 9-44363
Flex Handle, 18 inch, 1/2 Drive	Sears 9-44202
Spark Plug Socket 5/8	Sears 9-43324
Spark Plug Socket 13/16	Sears 9-43325
Universal Joint, 3/8 drive	Sears 9-4435
Universal Joint, 1/2 drive	Sears 9-4425
Pliers, Diagonal Side cutting	Sears 9-45075
Pliers, Long nose	Sears 9-45102
Pliers, Tongue and groove	Sears 9-45381
Pliers, Slip Joint	Sears 9-45378
Feeler Gauge set	Sears 9-40811
Steel Rule, 6 inch 1/64 graduation	
Brass Drift, 7 inch	
Center punch	Sears 9-42862
Flare Nut Wrench set SAE	Sears 9-44565
Flare Nut Wrench set Metric	Sears 9-44566
Adjustable wrench, 10in.	Sears 9-44604
Digital Volt-Ohm Meter (Fluke 88 preferred)	Sears 34-82139