**Syllabus – AUSV 1323 – Fall Semester 2014**

**Weber State University – Automotive Technology Department**

**Automotive Electronics Part 2**

**(2 credit hours)**

**Course Description:**

This course covers the theory of operation, diagnosis, and repair of automotive electrical systems. This is part 2 of a two-part course. Each part is two credit hours for a total of four credit hours.

**Prerequisite**

1. The WSU Shop Safety Module [www.weber.edu/automotive](http://www.weber.edu/automotive)
2. Completion of the two required S/P2 certifications [www.sp2.org](http://www.sp2.org/)
3. AUSV 1000 – Introduction to Automotive Service

**Communication Policy**:

* When necessary, the professor will contact the students through text messaging or their WSU wildcat email address (unless you provide a different preferred email address in your online preferences).  Students should check their email a few times per week; this is especially important on the weekends and before driving to class.
* Text messaging, phone calls, and surfing the Internet during class is unprofessional, distracting, and is prohibited.  Many employers do not allow cell phone use during normal work hours.  Please silence all cell phones and audible “silent” vibrations.  Communication with the instructor via phone, email, and text messaging is allowed until 6:00 p.m. (please include your name). Unwanted phone calls and/or text messaging is considered harassment and is against the law.

**Behavioral Expectations and skills**

According to the WSU Automotive Department National Advisory Committee recommendations, all students are expected to have the following behavioral traits:

1. Integrity - Behaves with honor and dignity; does the right thing.
2. Reliability - Sticks with it to get the job done
3. Trustworthy and Honest - Holds self and others to highest standards
4. Passion for Excellence
5. Initiative - Thinks outside the box
6. Innovation and Technical Excellence - Discovers better ideas and applies expertise
7. Commitment to Quality
8. Courage - Fights to turn dreams into realities
9. Community Commitment - Acts to enhance the community
10. Conduct – Follow the WSU student code of conduct:

**All students are expected to have the following skills:**

1. Be self-motivated enough to be able to plan, organize and prioritize time and workload in order to accomplish tasks and meet deadlines.
2. Develop and safeguard professional relationships; demonstrate interpersonal networking skills
3. Demonstrate computer information literacy (including: email, typing, Internet navigation, Microsoft Office Professional (Access, Excel, Word, PowerPoint))
4. Demonstrate analytical skills
5. Work with or contribute to a work group or team to complete assigned task(s)
6. Communicate in professional written form
7. Compose and produce technical reports, documents and related material present technical information in a professional manner to a variety of audiences
8. Monitor or track information or data
9. Evaluate information against a set of standards
10. Weigh the relative costs and benefits of a potential action and make a decision; acumen (good judgment).

**Contact Information:**

* Professor:
* Office:
* Office Hours:
* Office Phone:
* Cell Phone:
* Fax:
* E-mail:
* Facebook: [www.facebook.com/weberauto](http://www.facebook.com/weberauto)
* YouTube: [www.youtube.com/weberauto](http://www.youtube.com/weberauto)

**Class Time and Location:**

* Room
* Class Dates:

**Required Materials:**

* Text Book - TBD
	+ A WSU Student Photo ID Card. – This is required to check out tools or equipment from the tool room.
	+ Basic hand tool set.
	+ Access to Internet to access web-based training.
* Safety goggles/glasses.  These must be worn in the shop at all times.

**Learning Outcomes (NATEF Tasks):**

The Automotive Technology program at Weber State University is accredited by the [National Automotive Technicians Education Foundation](http://www.natef.org/) (NATEF).  To obtain NATEF accreditation, certain [tasks](http://www.natef.org/program_standards/auto/task_list.cfm) must be taught or performed in each of the eight Automotive Service Excellence ([ASE](http://www.ase.com/)) areas.

The course covers about one third of the NATEF Master Automotive Service Technician (MAST) tasks from area A6 – Electrical Systems. Approximately half of the following tasks are covered in the part 1 class; another third of the tasks will be covered in the parts 2 class. The remaining tasks will be covered in AUSV 2120. For concurrent enrollment classes, determination of task coverage for part 1 must be made in cooperation with the high school instructors and the WSU automotive department.

**VI. ELECTRICAL/ELECTRONIC SYSTEMS**

**A. General: Electrical System Diagnosis**

1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm’s Law).
3. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance.
4. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
5. Check operation of electrical circuits with a test light.
6. Check operation of electrical circuits with fused jumper wires.
7. Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems.
8. Diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.
9. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
10. Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.
11. Replace electrical connectors and terminal ends.
12. Repair wiring harness.
13. Perform solder repair of electrical wiring.
14. Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.
15. Repair CAN/BUS wiring harness.

**B. Battery Diagnosis and Service**

1. Perform battery state-of-charge test; determine necessary action.
2. Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.
3. Maintain or restore electronic memory functions.
4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.
5. Perform slow/fast battery charge according to manufacturer’s recommendations.
6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.
7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
8. Identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting vehicle battery.
9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.

**C. Starting System Diagnosis and Repair**

1. Perform starter current draw tests; determine necessary action.
2. Perform starter circuit voltage drop tests; determine necessary action.
3. Inspect and test starter relays and solenoids; determine necessary action.
4. Remove and install starter in a vehicle.
5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.
6. Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition.

**D. Charging System Diagnosis and Repair**

1. Perform charging system output test; determine necessary action.
2. Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions.
3. Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
4. Remove, inspect, and re-install generator (alternator).
5. Perform charging circuit voltage drop tests; determine necessary action.

**E. Lighting Systems Diagnosis and Repair**

1. Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action.
2. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
3. Aim headlights.
4. Identify system voltage and safety precautions associated with high-intensity discharge headlights.

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

1. Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action.
2. Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action.

**G. Horn and Wiper/Washer Diagnosis and Repair**

1. Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.
2. Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.
3. Diagnose (troubleshoot) windshield washer problems; perform necessary action.

**H. Accessories Diagnosis and Repair**

1. Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.
2. Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.
3. Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action.
4. Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action.
5. Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
6. Remove and reinstall door panel.
7. Check for module communication errors (including CAN/BUS systems) using a scan tool.
8. Describe the operation of keyless entry/remote-start systems.
9. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
10. Verify windshield wiper and washer operation, replace wiper blades.
11. Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.
12. Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.
13. Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.
14. Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.

**Safety Information:**

The Weber State University (WSU) Automotive Department has made student safety a top priority.  WSU has made every effort to comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

Every automotive student is required to complete a shop safety module and two certifications from the Safety and Pollution Prevention (S/P2) website.  These requirements insure that our students have been exposed to local, state, and federal safety and environmental regulations.

**Grading Criteria:**

The following criteria will determine your grade

* Compliance with safety regulations including wearing eye protection during lab assignments (5%)
* Lab assignments and worksheets (40%)
* Completion of required web-based Training (15%)
* Class participation and reading assignments (10%)
* Chapter quizzes (10%)
* Hands-on final exam (20%)

Letter grades are determined by the percentage of possible points accumulated.

* A = 95% - 100%
* A- = 90% - 94%
* B+ = 87% - 89%
* B = 84% - 86%
* B- = 77% - 83%
* C+ = 74% - 76%
* C = 70% - 73%
* C- = 67% - 69% (You must have a grade of C or higher to count towards graduation)
* D+ = 64% - 66%
* D = 60% - 63%
* D- = 57% - 59%
* E = Below 57%

**Policies:**

1. Safety glasses/goggles must be worn in the shop at all times.
2. While working in the shop, proper attire must be worn.  This applies, but is not limited, to:
3. Uniforms/clothing
4. Shoes
5. Jewelry
6. Proper hair restraint
7. A student WSU ID card is required to check out tools from the tool room.
8. Respect:
	1. Customer’s vehicles by using seat and fender covers
	2. Other students and their learning experience
	3. WSU tools and vehicles by identifying problems with tools and vehicles when found.
	4. Class is not over until all tools are put away and everything is clean and organized.
9. Attendance is required every day.  Each day’s topics build on the previous day’s topics.  If you must miss a day of class your grade will suffer. Please make arrangements to obtain the reading assignment and homework from the Professor of you must miss class.
10. Late work will NOT be accepted unless arrangements are made ahead of time with the Professor.  The maximum credit allowed for late work is 50%.
11. All of your assignments must be completed and submitted online by their posted dates at 11:59 p.m. The use of cell phones during class is prohibited except in an emergency.  Text messaging is always prohibited.
12. All of your assignments must be completed on the day assigned.  Class will follow the sequence listed in the schedule.
13. Unless you are assigned to work in groups for lab work, you must do your own work.  Collaboration with other students is not allowed.
14. Dishonesty will not be tolerated and will result in a score of zero for the assignment, quiz, or exam.

**Recommendations to get the most from this course:**

1. Be early or on time.  Class will begin without you.
2. Ask questions to clarify points that you do not understand.
3. Follow directions as they are given to you.

**Services for Students with Disabilities:**

"Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in room 181 of the Student Services Center. SSD can also arrange to provide course materials (including the syllabus) in alternative formats if necessary."

For more information about the SSD contact them at 801-626-6413, ssd@weber.edu, or <http://departments.weber.edu/ssd/>.

**Course Schedule:**

* **TBD**