AT-35 Intro to HEV/EV Syllabus

Course Information

- Semester and Year: Fall 2025
- Course ID and Section number: AT-35-E9068
- Instructor's name: Ernest Shull
- Day and time of required meetings: Monday, Wednesday, 5:45 PM – 8:55 PM
- Location: AT-128
- Course units: 3

Instructor Contact Information

- Office location or Online AT-122
- Office hours: Open Door Policy
- Phone number: 707-476-4221
- Email address: ernest-shull@redwoods.edu

Required Materials:

Safety Glasses Z87.1+

Catalog Description

- This course explores the use of Hybrid and Electric battery power for vehicle propulsion. Topics will include safety when working around high voltage, maintenance, drivability, inverter/converter, power transfer, and battery technology. Batterystorage, hybrid re-generation systems, electric vehicle applications and their integrated systems from various manufacturers will be discussed. This course may be used as preparation for the student to successfully complete the L3 ASE certification exam. The Light Duty Hybrid/Electric Vehicle Specialist (L3) is a new, advanced level certification geared toward technicians who perform diagnoses and repairs on hybrid/electric vehicles. Students are advised that the Automobile Electrical/Electronic Systems (A6) and Engine Performance (A8) certifications are required to register for the (L3) certification.

Textbook information

- Title & Edition: Hybrid, Electric & Fuel-Cell Vehicles, 3rd Ed.Author: Jack Erjavec, Nathan Smith, Michael Godson
- ISBN-13: 978-1-305-95257-7

Course Student Learning Outcomes

1. Demonstrate safety while performing tasks on hybrid and electric vehicles.
2. Diagnose high voltage battery failures.
3. Diagnose hybrid and electric vehicle drivetrain and controls.

Course Attendance Policy

Attendance will be taken at the start of each class session. **Students who accumulate 4 absences during the first 10 weeks of class may be dropped from this class by the instructor. There may be situations where this will occur due to unforeseen circumstances. Please contact me so we can discuss your attendance and possible makeup work.**

Punctuality is essential in the workplace and is considered respectful of fellow students and instructors. Excessive tardiness can affect your score as well. Less time present means you have less time to complete tasks.

Students who have experienced extenuating circumstances can complete & submit the **Excused Withdrawal Petition** to request an Excused Withdrawal (EW) grade instead of the current Withdrawal (W) or non-passing (D, F & NP) grades. The EW Petition is available from the Admissions and Records Forms Webpage. Supporting documentation is required.

Evaluation & Grading Policy

Course Evaluation

- **Course Points**
- All Labs will contribute 50% towards your final grade. Labs are graded at 20 points per lab. 10 Points towards participation and 10 points towards Repair Orders. Please fill out your repair orders as neat and complete as possible. Some labs will be worth more points if they are a multi-day lab.
- Tests and Homework will contribute towards the other 50% with 10% towards Homework and 40% toward Tests. Homework will usually be completed as a group after the lecture, however due to certain time constraints it may have to be completed after class.
- Your final grade will be based on your grade in Canvas however I will also take into consideration attendance and attitude in the shop when considering your final posted grade. If you ever have any questions about this, feel free to contact me.
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Extra Credit - Each student may elect independently to read and report on a topic related to this course from a source other than the course text i.e. recognized trade publications, library reference material, magazines, newspaper articles, etc... The report must be no less than one page typed and no longer than three pages typed. You must properly cite your references on a separate page. You may earn up to

50 points per report and you may turn in a maximum of 1 report per semester. Please inform the instructor of your topic prior to doing this assignment.

Educational Accessibility and Support

College of the Redwoods is committed to providing reasonable accommodations for qualified students who could benefit from additional educational support and services. You may qualify if you have a physical, mental, sensory, or intellectual condition which causes you to struggle academically, including but not limited to:

- Mental health conditions such as depression, anxiety, PTSD, or bipolar disorder
- Common ailments such as arthritis, asthma, diabetes, autoimmune disorders, and diseases
- Temporary impairments such as a broken bone, recovery from significant surgery, or a pregnancy-related disability
- Neurodevelopmental disorders such as a learning disability, intellectual disability, autism, acquired brain injury, or ADHD
- Vision, hearing, or mobility conditions

Available services include extended test time, quiet testing environments, academic assistance and tutoring through the LIGHT Center, counseling and advising, alternate formats of course materials (e.g., audio books, braille, E-texts), assistive technology, learning disability assessments, approval for personal attendants, interpreters, priority registration, on-campus transportation, adaptive physical education and living skills courses, and more. If you believe you might benefit from disability- or health-related services and accommodations, please contact Student Accessibility Support Services (SASS). If you are unsure whether you qualify, please contact Student Accessibility Support Services (SASS) for a consultation: sass@redwoods.edu.

SASS office locations and phone numbers

Eureka campus

- Phone: 707-476-4280
- Location: Learning Resource Center (Library)

Del Norte campus

- Phone: 707-465-2353
- Location: main building, near the Library

Klamath-Trinity campus

- Phone: 707-476-4280

Course Schedule

Day	*Theory*	*Lab*	*Assigned Reading*
8-25	*HEV/EVs*	*HEV/EVs*	*Ch. 1*
8-27	*HEV/EVs Safety*	*HEV/EVs Safety*	*Ch. 2*
9-1	***LABOR DAY***	***NO CLASS***	
9-3	*Electrical Theory*	*Electrical Theory*	*Ch. 3*
9-8	*Uscope DSO*	*Pico DSO*	
9-10	***Test 1***	***Chapter 1-3 & DSO***	
9-15	*Hev/EV Maintenance*	*Hev/EV Maintenance*	*Ch. 4*
9-17	*Hev/EV Maintenance*	*Hev/EV Maintenance*	*Ch. 4*
9-22	*Hev/EV Maintenance*	*Hev/EV Maintenance*	*Ch. 4*
9-24	*Hev/EV Maintenance*	*Hev/EV Maintenance*	*Ch. 4*
9-29	*Hev/EV Maintenance*	*Hev/EV Maintenance*	*Ch. 4*
10-1	***Test 2***	***Maintenance***	
10-6	*Components & System*	*Components & System*	*Ch. 6 & Ch.7*
10-8	*Components & System*	*Components & System*	*Ch. 6 & Ch.7*
10-13	*Components & System*	*Components & System*	*Ch. 6 & Ch.7*
10-15	*Components & System*	*Components & System*	*Ch. 6 & Ch.7*
10-20	***Test 3***	***Components & Systems***	
10-22	*HV Batt. & Thermal Mgt.*	*HV Batt. & Thermal Mgt.*	*Ch. 5 & Ch 8*
10-27	*HV Batt. & Thermal Mgt.*	*HV Batt. & Thermal Mgt.*	*Ch. 5 & Ch 8*
10-29	*HV Batt. & Thermal Mgt.*	*HV Batt. & Thermal Mgt.*	*Ch. 5 & Ch 8*
11-3	*HV Batt. & Thermal Mgt.*	*HV Batt. & Thermal Mgt.*	*Ch. 5 & Ch 8*
11-5	*HV Batt. & Thermal Mgt.*	*HV Batt. & Thermal Mgt.*	*Ch. 5 & Ch 8*
11-10	***Test 4***	***HV Batteries/Management***	
11-12	*HEV/EV Ops & Diag.*	*HEV/EV Ops & Diag.*	*Ch. 9, 10, 11*
11-17	*HEV/EV Ops & Diag.*	*HEV/EV Ops & Diag.*	*Ch. 9, 10, 11*
11-19	***FALL BREAK***	***FALL BREAK***	
11-24	***FALL BREAK***	***FALL BREAK***	
11-26	*HEV/EV Ops & Diag.*	*HEV/EV Ops & Diag.*	*Ch. 9, 10, 11*
12-1	*HEV/EV Ops & Diag.*	*HEV/EV Ops & Diag.*	*Ch. 9, 10, 11*
12-3	*HEV/EV Ops & Diag.*	*HEV/EV Ops & Diag.*	*Ch. 9, 10, 11*
12-8	***Test 5***	***HEV/EV Ops & Diag.***	
12-10	***Make Up Day***	***Open Lab***	
12-16	***FINAL EXAM***	***1:00PM – 3:00PM***	