Post Office Box 85622
Richmond, Virginia 23285-5622
www.reynolds.edu

Reynolds COMMUNITY COLLEGE

Grant Number: DE-EE0002492

Title of Project: Transportation Electrification….

Grant Recipient:
J. Sargeant Reynolds Community College
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Richmond, VA

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DE-EE0002492

ADVANCED ELECTRIC DRIVE VEHICLE

J. Sergeant Reynolds Community College

A. Objectives

This project has accomplished the following objectives:

- Address the critical need for technician training in new and emerging propulsion technologies by developing new courses. The courses curriculum will include information and training on Electric Vehicles (EV), Plug-In Hybrid Electric Vehicles (PHEV), and Fuel Cell Vehicles (FCV). The new courses shall be collated into an advanced electric drive vehicle Career Studies Certificate (CSC);
- Integrate the new certificate with the existing Associate of Applied Science (AAS) Degree and Certificate automotive degrees;
- Disseminate these leading edge courses throughout the Commonwealth of Virginia and neighboring Mid-Atlantic States;
- Provide training opportunities for displaced workers and underrepresented populations seeking careers in the automotive industry.

B. Project Scope

The scope of work for this project is outlined below:

- Develop and implement courses in the following technical areas:
    - Principles of operation, diagnosis and repair of Electric Vehicles, Plug-In Hybrid Vehicles, and Fuel Cell Vehicles.
    - Electronic control systems including sensors, controllers and other advance electronic components required for the operation of Electric Vehicles, Plug-In Hybrid Vehicles, and Fuel Cell Vehicles.
    - Industrial safety as it applies to new and emerging technologies.
- Develop the five courses in a format which is easily disseminated to maximize student accessibility. Offer the academic portions of the courses via distance education (e-learning) and the laboratory portions (hands-on) on weekends at JSRCC and other regional sites.
- Consolidate these advanced technologies into a career studies certificate (CSC) which can be made available to existing technicians, career changers, and recent high school graduates.

C. Product

The following automotive technical courses have been developed and content is available upon request.

- AUT 230, Introduction to alternative fueled & hybrid vehicles
- AUT 243, Automotive control electronics
- AUT 253, Electric vehicles
- AUT 254, Plug In hybrid vehicles
- AUT 256, Fuel cell electric vehicles

Course Syllabi are provided as an outline of course content available.

J. Sargeant Reynolds Community College

SYLLABUS FOR (AUT 230 - 3 credits) INTRODUCTION TO ALTERNATIVE FUELED & HYBRID VEHICLES – DISTANCE LEARNING (DL) CLASS ONLY

Effective Date: Fall 2013

Instructor: XXXXX **Office Phone:** XXXXX

Email: @reynolds.edu **Office Location:** CCC

Office Hours: Need to list your hours here – Please do not put "see posted hours" because they will not be here to see them

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Textbook(s) (including laboratory manuals, workbooks, etc.):

Hybrid and Alternative Fuel Vehicles, 3/E
Halderman
©2013 | Prentice Hall | Published: 05/01/2012
ISBN-10: 013278484X | ISBN-13: 9780132784849

Learning activities (projects, papers, presentations, reading, oral participation, tests, etc.):

a) Each student will complete the assigned readings and class assignments
b) Each student will identify and understand the theory and functioning of Electronic vehicle control systems.
c) Each student will identify and understand the theory and functioning of Electronic Control system components.
d) Each student will be able to explain safety procedures on electronic control system for electric drive vehicles in a discussion board.
e) The student will complete examinations on all major topics.
f) The student will participate in online discussions and activities with classmates and Instructor
g) The student will view videos/films pertaining to the subject matter.

JSRCC Form 05-0003
Updated March 4, 2003

Applicable learning resources

a) Various video's from many sources
b) Service Information on All Data
c) Service Information on Mitchell on Demand

Evaluation (grading scale, make-up policy, etc.):

Attendance	= 10%	A = 91 – 100
Unit exams and quizzes	= 25%	B = 81 – 90
General lab performance	= 40%	C = 71 – 80
Final exam	= 25%	D = 61 – 70
Total	= 100%	F = 60 and below

Midterm assessment: There will be a Midterm and Final written exams.

Attendance requirements: Attendance – 10% of grade.

Call in if you are unable to attend class – 523-.54XX

Attendance Certifications: Instructor is required by the college to send in Attendance Certifications twice during the semester: the first at the 15% point and the second at the 60% point. If you have not come to a face-to-face meeting at the 15% point (14 days after the official start date for classes), you will be withdrawn as "Never Attended." If you have not emailed instructor or completed any assignments for the two weeks before the 60% point, you will be administratively "withdrawn" from the class. For those of you on financial aid, this is an issue. **Students who do not attend class at all prior to the drop date must be reported and will be *dropped.* Whereas, students who discontinue class attendance before the withdrawal date must be reported and will be *withdrawn.***

Attendance in Distance learning courses

All attendance policies and criteria apply to distance learning students. It is the responsibility of the faculty to ensure the accurate and timely reporting of the

attendance of students enrolled in the course. For the purpose of meeting the reporting requirements outlined within this policy, faculty should use the following guidelines in developing and managing their distance courses:

1. You must meet all deadlines for submitting assignments or notify the instructor as to why you will miss the deadline and when you will submit the assignment. Failure to submit assignments within 7 days of the due date will earn 0 points on that assignment. See Rubric for details.

2. You are required to participate in a documented activity each week within a term.

"In order to achieve the maximum benefit of this class, it is expected that you attend all classes. Per JSRCC's JSRCC Policy 1-3, Student Attendance, a record of your attendance will be maintained by the instructor and reported to the Admissions and Records office. If you do not attend class for a substantial amount of time, you may be subject to an adverse effect on your enrollment status in the class and/or your grade. It is your responsibility to inform the instructor of any anticipated absences. If you decide that you do not want to or cannot complete this course, it is recommended that you comply with the institution's drop or withdrawal policy by completing the appropriate forms in the Student Success Center by the appropriate deadline."

Schedule of class events--topics, tests, other learning activities:

Course Description:
A 3 cr. Class that introduces current trends in alternative fueled vehicles including current alternative fueled vehicles and the implication and safety precautions necessary for working on hybrid vehicle systems. Lecture 3 hours per week.

General Course Purpose:
To examine alternative fueled vehicle and hybrid electric vehicle systems. Safety will be emphasized.

Student

Course Objectives:
Upon completing the course, the student will be able to:
1. Demonstrate knowledge of safety in all areas of alternative

Outcomes/Objectives - Instructor elaboration of the expected student outcomes or specific course objectives (optional):	fueled and hybrid vehicles. 2. Understand principles of operation of alternative fueled and hybrid vehicles systems. 3. Identify and list various alternative fueled and hybrid vehicles components and their relationship to hybrid system operation. 4. Describe and identify different types of alternative fueled and hybrid vehicles.

ON-LINE Expectations:

The Center for Distance Learning enables and supports learning options in a variety of settings through innovative, alternative delivery methods that provide access to learning opportunities from your home, office, or anywhere you have Internet access.
These options are designed to increase educational access to students for whom work schedules, family responsibilities, or other life demands restrict attendance at traditional on-campus classes. Online course work and interactions with the instructor and classmates are completed using the JSRCC Blackboard course management system.

SmarterMeasure
Learning readiness indicator
Formerly ROADI

Are you interested in taking Distance Learning courses at JSRCC? Take our assessment to see if you are ready for online learning.
The assessment will take approximately 45 minutes to complete. To take the assessment,

1. Be sure that you are already admitted as a student at JSRCC
2. Have your Student ID number on hand
3. Go to http://reynolds.smartermeasure.com/
4. Select the **current semester** as your Username.
5. Type in **Reynolds** as your Password

CDL001 — Orientation to Learning *Online*

All students who are **new to distance learning** are expected to complete

1. COURSE PRE-REQUISITES

Learners should have a basic understanding of electricity works You should also have an understanding of electrical terms and concepts. Learners should also be comfortable using the Internet along with the basic operation of PCs, including installing software and browser plug-ins.

2. ENTRY LEVEL SKILLS/KNOWLEDGE

Participants need to be aware of the technology expectations in a distance courses.

2.1 Prerequisite Skills:
Learners in online classes must be proficient users of the World Wide Web and are responsible for adhering to all the following criteria. If you are unable to fulfill these requirements, then another class delivery method may be more appropriate for you.
1. You must be able to check the class Web site and your e-mail daily or every other day for most online classes.
2. You must have sufficient Internet access to do all the class activities, and you are responsible for finding alternative resources when necessary.
3. You must use an approved version of a Browser to perform all class Web activities (see “Software” later in this document).
4. You must have strong Internet research skills.
5. You must be able to perform the following Web browser functions:
   a. Locate and follow hyperlinks and navigate "back" and "forward"
   b. Add and access favorites/bookmarks so you can revisit important websites
   c. Edit your Web browser preferences
   d. Use the "Go" or “History” function to access recently visited pages

CDL001: Orientation to Learning Online before the start of their first online course(s). **CDL001: Orientation to Learning Online** is a unique Orientation module that prepares students for learning at a distance.

Within a week after your enrollment in your first online class, **CDL001** will appear as module within your Blackboard site. You can complete **CDL001** on your time and at a distance. The Orientation helps you to understand how typical online courses are structured, paced, and facilitated. You will have the opportunity to interact with a facilitator and with other students, as you prepare for learning at a distance.

Special Features of the JSRCC CDL001:

- The module can be completed within four to five days.
- The learning activities require a total time commitment of 4-6 hours.
- The entire module is delivered online, through Blackboard.
- The module is facilitated by a dedicated instructor.
- The module allows students to interact with other new distance learners.
- CDL001 "teaches by doing"; students learn how to use Blackboard tools while gaining study skills, time management skills, and other essential information necessary for independent learning.
- Students who successfully complete CDL001 receive a "Certificate of Completion" to share with their online instructors.

e. Reload (refresh) the screen
f. Print Web pages--adjust page setup and print options so that the URL (web address) and access date are printed on the page (it is a good idea to print all important pages or at least the top levels of important sites to provide a record of your access)
g. Use your browser Help files for additional assistance

2.2 Research Skills:
Learners should possess computer skills to do online research using a variety of search engines; be familiar with your college's library website and available methods of obtaining articles and documents via J. Sargeant Reynolds' library resource site.

2.3 Writing and Communication Skills:
Learners should possess a firm command of written communication skills, including the mechanics of writing and grammar, the ability to organize thoughts, and the ability to demonstrate those skills in all written work.
Observation of "Netiquette": All your online communications need to be composed with fairness, honesty and tact. Spelling and grammar are very important in an online course. What you put into an online course reflects your level of professionalism. ***Several netiquette guidelines are listed below:***

Sentence Capitalization:
□ Typing in all caps is considered screaming and will NOT be tolerated
□ Example: **SUNDAY WILL BE A LONG DAY!**
□ Various studies have concluded that typing in all caps takes longer and is more difficult to read.
□ Recipient may think you are overly excited
Leaving the subject field blank:
□ Always fill in the subject with a concise statement describing the email.
□ Do not use all caps or put in phrases such as "Help" or "Hi".
□ Failure to follow netiquette guidelines when filling in the subject line of an email may result in your correspondence being discarded as spam.
Colored text and background colors:

□ Use colors sparingly in your emails – whether it is text or fill colors
□ Certain colors can make emails difficult to read.

Return receipt request:

□ Allows you to track when the recipient opens your email – you should use this email feature sparingly.
□ Can be very annoying to the recipient of the email.

Grammar and spelling check:

□ Proofread emails for errors
□ Capitalize your sentences and use appropriate punctuation
□ Refrain from using multiple !!!!!!! or ????????

These netiquette guidelines will help to ensure you are courteous and use proper manners while corresponding with your friends, family and business associates. Remember one point – someone is always watching or tracking your emails, just consult Col. Oliver North if you have doubts (deleted emails were used in the Iran Contra proceedings).

2.4 Computer Literacy:

Learners in online classes must be proficient with the basic functions of a word processor as listed below. If you are unable to fulfill these requirements, another class delivery method is more appropriate for you.
For word processing, the following software and skills are essential:
1. Approved Word processing software (note that Microsoft Works is not compatible with MS Word) or the ability to turn in assignments with a file extension of .doc, .docx, .rtf, or .pdf
2. Edit: copy, cut, paste, find, replace
3. Manage files using the directory system of the operating system (this encompasses creating new files and folders, as well as being able to navigate through your operating system and word processor to perform open, close, save, and save as functions).

2.4.1 Software:

Term	Definition
Certified	fully tested and supported
Compatible	key application areas tested
Not tested	specified Browser is not supported for the Operating System

Microsoft® Internet Explorer® Web Browsers

	Windows XP	Windows Vista Desktop	Mac OS 10.3	Mac OS 10.4	Mac OS 10.5
Internet Explorer 6	Compatible	Certified	Not Tested	Not Tested	Not Tested
Internet Explorer 7	Compatible	Certified	Not Tested	Not Tested	Not Tested

Mozilla® Firefox and Netscape® Navigator Web Browsers

Firefox 1.5 is not supported for Blackboard Academic Suite Release 8.0 and above. It is recommended that Firefox 1.5 users upgrade to Firefox 2.0 to access the latest security patches and Mozilla support.

	Windows XP	Windows Vista Desktop	Mac OS 10.3	Mac OS 10.4	Mac OS 10.5
Firefox 1.5	Not Supported	Not Supported	Compatible	Certified	Not Tested
Firefox 2.0	Certified	Certified	Not Tested	Certified	Compatible
Firefox 3.0	Compatible	Compatible	Compatible	Compatible	Compatible

Apple® Safari® Web Browsers

	Windows XP	Windows Vista Desktop	Mac OS 10.3	Mac OS 10.4	Mac OS 10.5
Safari 2	Not Tested	Not Tested	Not Tested	Certified	Certified
Safari 3	Not Tested	Not Tested	Not Tested	Compatible	Compatible

AUT 230
Automotive Advanced Technology

Course Outline: (Subject to change)
Aut 230 Introduction to Alternative Fuels and Hybrid Vehicles
Distance Education class only – no labs

	Topic	Discussion Board	Assignments
Week 1	Introduction to Alternative Fueled and Hybrid Vehicles ➢ What are Alternative Fueled and Hybrid Vehicles ➢ History	Explain why you believe electric and hybrid vehicle production declined during the 1900's.	• Pre-Test • Read Ch. 2 • View PPT • Read articles
Week 2	Introduction to Alternative Fueled and Hybrid Vehicles ➢ Early Alternative Fueled and Hybrid Vehicles ➢ Types of Alternative Fueled and Hybrid Vehicles	Respond to two (2) of your classmates discussion posts by asking a follow up question	• Post a link to a video from YouTube • 10 Question Quiz • Final Reflection
Week 3	Alternative Fueled and Hybrid Vehicles Safety Procedures ➢ Alternative Fueled Vehicle Safety ➢ High Voltage Safety Equipment	Describe what PPE to use, how to properly check it and why it is important. Explain how to safely "power down" a hybrid vehicle.	• Read Ch. 17 & 18 • View PPT • Read articles
Week 4	Alternative Fueled and Hybrid Vehicles Safety Procedures ➢ First Responder Procedures ➢ Electric Shock Potential ➢ Preventing Current Flow through High-Voltage Cables	Respond to two (2) of your classmates discussion posts by asking a follow up question	• Post a link to a video from YouTube • 10 Question Quiz • Final Reflection
Week 5	Alternative Fueled Vehicles ➢ Ethanol ➢ E85 ➢ Methanol ➢ Propane ➢ Compressed Natural Gas (CNG) ➢ Liquefied Natural Gas (LNG)	Describe how three (3) alternative fuels compare to gasoline listing the benefits and drawbacks to each.	• Read Ch. 1,4,5, & 6 • View PPT • Read articles
Week 6	Alternative Fueled Vehicles ➢ P-Series Fuels ➢ Synthetic Fuels ➢ Bio-Diesel ➢ Hydrogen	Respond to two (2) of your classmates discussion posts by asking a follow up question	• Post a link to a video from YouTube • 10 Question Quiz • Final Reflection
Week 7	Batteries and Battery Service ➢ Introduction ➢ Battery Technology ➢ High-Voltage Battery in the Hybrid System	Explain how batteries SOC impacts their life span and what recycling capabilities HV batteries have.	• Read Ch. 7 • View PPT • Read articles
Week 8	Batteries and Battery Service ➢ Nickel-Metal Hydride Technology ➢ Auxiliary Battery in the Hybrid System	Respond to two (2) of your classmates discussion posts by asking a follow up question	• Post a link to a video from YouTube • 10 Question Quiz

	➢ Lead-Acid Technology ➢ Lithium-Ion Battery Tech.		• Final Reflection
Week 9	Electric Motors, Generators, and Controls ➢ Fundamentals of Magnetism, Electromagnetism, and Electromagnetic Induction ➢ Electric Motors ➢ Brushless Motors	Describe how an electric motor works and the benefits they provide when combined with gasoline engines.	• Read Ch. 8 • View PPT • Read articles
Week 10	Electric Motors, Generators, and Controls ➢ Motor Control ➢ Capacitors in Hybrid Controllers ➢ Converters and Inverters ➢ Electric Power Steering	Respond to two (2) of your classmates discussion posts by asking a follow up question	• Post a link to a video from YouTube • 10 Question Quiz • Final Reflection
Week 11	Regenerative Braking Systems ➢ Principles of Regenerative Braking ➢ Regenerative Braking ➢ How the Regenerative Braking System Works ➢ Deceleration Rates	Describe two (2) examples of different types of vehicle regeneration systems that manufacturers use.	• Read Ch. 9 • View PPT • Read articles • 10 Question Quiz • Final Reflection
Week 12	Hybrid Vehicle Transmissions and Transaxles ➢ Manual versus Automatic ➢ Conventional Automatic Transmissions	Describe three (3) transmission enhancements that improve fuel efficiency and how customers can benefit.	• Read Ch. 10 • View PPT • Read articles
Week 13	Hybrid Vehicle Transmissions and Transaxles ➢ Continuously Variable Transmissions (CVT)	Respond to two (2) of your classmates discussion posts by asking a follow up question	• Post a link to a video from YouTube • 10 Question Quiz • Final Reflection
Week 14	Hybrid Vehicle Heating and Air Conditioning ➢ Hybrid ICE Cooling and Cabin Heating ➢ Hybrid Electrical System Cooling	Explain how heating and cooling systems operate without using the internal combustion engine.	• Read Ch. 11 • View PPT • Read articles
Week 15	Hybrid Vehicle Heating and Air Conditioning ➢ Hybrid Air-Conditioning Systems	Respond to two (2) of your classmates discussion posts by asking a follow up question	• Post a link to a video from YouTube • 5 Question Quiz • Final Reflection
Week 16	Final Exam Week	Final Exam	

Aut 230: Items highlighted in "yellow" indicate Environmentally Sustainable assignments.

JSRCC Form 05-0003
Updated March 4, 2003

J. Sargeant Reynolds Community College

SYLLABUS FOR (AUT 243 – 4 credits)
ADVANCED AUTOMOTIVE TECHNOLOGY
CONTROL ELECTRONICS

Effective Date: SPRING 2013

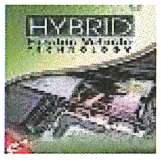
Instructor: Lawrence Schwendeman **Office Phone:** 804-523-5938

Email: lschwendeman@reynolds.edu **Office Location:** # 252

Office Hours: M-F 1:00 PM- 5:00 PM
Need to list your hours here – Please do not put "see posted hours" because they will not be here to see them

Textbook(s) (including laboratory manuals, workbooks, etc.):

American Technical Publishers, Inc.



Hybrid Electric Vehicle Technology ATP eTextbook
ATP eTextbook: 279 pages, 197 illustrations, softcover
Download Size: 34.2 MB
eReader: Adobe Digital Editions

ISBN: 978-0-8-2690066-1

Learning activities (projects, papers, presentations, reading, oral participation, tests, etc.):

a) Each student will complete the assigned readings and class assignments
b) Each student will identify and understand the theory and functioning of Electronic vehicle control systems.
c) Each student will identify and understand the theory and functioning of Electronic Control system components.
d) Each student will practice required safety procedures on electronic control system for electric drive vehicles.
e) The student will complete examinations on all major topics.
f) The student will view films pertaining to the subject matter.

Applicable learning resources (published materials--books, periodicals, infor-mational packages, etc.; films, tapes, slides, specimen, models, charts, etc.):

a) Hybrid, Electric and Fuel-Cell Vehicles, Erjavec
b) Power Point slides for "Hybrid and Alternative Fuel Vehicles"

JSRCC Form 05-0003
Updated March 4, 2003

Evaluation (grading scale, make-up policy, etc.):	Attendance	= 10%	A = 91 – 100
	Unit exams and quizzes	= 25%	B = 81 – 90
	General lab performance	= 40%	C = 71 – 80
	Final exam	= 25%	D = 61 – 70
	Total	= 100%	F = 60 and below

Assessment: There will be a Final written exam.

Attendance requirements:

Attendance – 10% of grade.

Call in if you are unable to attend class – 523-5938

Attendance

Instructor must take face-to-face attendance in accordance with JSRCC Policy 1-3. To get credit for attendance, not only do you have to show up to class, but you must also be awake, not leave early without prior agreement nor wander in and out of the classroom, and participate in activities.

The only excused absences are as follows:

1) Illness demanding medical attention (written documentation will be necessary)

2) Emergency or death in family (written documentation will be necessary) anything other than these two will have to be discussed with instructor. Instructor has final say if absence will be excused or not.

Leaving class early without proper notice to the instructor could result in an absence. Do not schedule appointments during class time.

Attending class on time is very important. You are considered late if you arrive to class fifteen minutes or more after posted start time. Three times late to class equals one unexcused absence.

Two unexcused absences will constitute a reduction of one letter grade. (Example: A grade; two unexcused absence equals a grade of B, four absences equals a grade of C, etc.)

Attendance Certifications: Instructor is required by the college to send in Attendance Certifications twice during the semester: the first at the 15% point and the second at the 60% point. If you have not come to a face-to-face meeting at the 15% point (14 days after the official start date for classes), you will be withdrawn as "Never Attended." If you have not emailed instructor or completed any assignments for the two weeks

before the 60% point, you will be administratively "withdrawn" from the class. For those of you on financial aid, this is an issue. **Students who do not attend class at all prior to the drop date must be reported and will be *dropped.* Whereas, students who discontinue class attendance before the withdrawal date must be reported and will be *withdrawn.***

"In order to achieve the maximum benefit of this class, it is expected that you attend all classes. Per JSRCC's JSRCC Policy 1-3, Student Attendance, a record of your attendance will be maintained by the instructor and reported to the Admissions and Records office. If you do not attend class for a substantial amount of time, you may be subject to an adverse effect on your enrollment status in the class and/or your grade. It is your responsibility to inform the instructor of any anticipated absences. If you decide that you do not want to or cannot complete this course, it is recommended that you comply with the institution's drop or withdrawal policy by completing the appropriate forms in the Student Success Center by the appropriate deadline."

Schedule of class events--topics, tests, other learning activities:

Course Description:
A 4 cr. Class that introduces advanced automotive technologies, including electronic control systems found in hybrid electric vehicle systems, battery electric vehicle systems, and fuel cell electric vehicle systems. Teaches theory, function, and operation of each electronic control systems and provides students an opportunity to perform diagnostic procedures and maintenance for these systems. Focuses on safety. Prerequisite: AUT 245 or program head approval. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose:
This course, which will be a requirement for the Advanced Automotive Technologies Career Studies Certificate, addresses the rapidly emerging automotive technologies of electronic control systems found in electric drive vehicles, which automotive technicians are now being required to service. The course was developed with funding provided by a grant from the Department of Energy.

Course Prerequisites/Co-requisites:
Prerequisite: AUT 245 or program head approval.

Student Outcomes/Objectives - Instructor

a) Student will demonstrate knowledge of safety in all areas of electronic controls for electric drive vehicle maintenance.

elaboration of the expected student outcomes or specific course objectives (optional):	b) Student will have a basic understanding of principles of electronic control systems operation for electric drive vehicles. c) Student will be able to identify and list various electronic control systems components and their relationship to electric drive vehicles operation. d) Student will have a basic understanding of the principles of control systems and their relationship to electric drive vehicles systems. e) Student will be able to describe and identify different types of electronic control systems for electric drive vehicles.

Behavioral Requirements:	1. **Arrival/Departure:** Respect schedules, arrive/depart on time and notify your instructor when changes are necessary. 2. **Courtesy:** Acknowledge the presence of others, and be considerate of others while they work, study or speak. 3. **Distractions:** Turn off cell phones and other electronic devices in class. 4. **Exit:** Keep your classroom and lab areas clean, orderly, and ready for use by others. 5. **Participation:** Allow for a free exchange of ideas without interruption. 6. **Preparation:** Come prepared and focus on the business at hand. 7. **Respect:** Respect others, their opinions and opportunity to learn. 8. **No open toe shoes will be allowed at anytime, you will not be allowed to participate and will receive a zero for that day.** 9. **You are required to wear safety glasses when you are in the lab area at all times. Failure to comply will result in you not being allowed to participate and receiving a zero for that day.** 10. **Students are <u>NOT</u> permitted to work in the Labs without Instructor supervision. The Instructor must be present any time students are in the Lab. Student projects must be related to the course their enrolled in and have Instructor permission, (Signed, Blue Form) The only reason for allowing Student projects is to provide practical application for the course of instruction.**

Important Policies to Consider

The following are exerts from the Policy Manual. Please refer to policy number for a complete description and consequences of not complying with each policy.

POLICY NO: 1-35 - TITLE: STUDENT CONDUCT (see policy for description of violations)
Students are expected to obey the law, show respect for properly constituted authority, perform contractual obligations, maintain integrity and high standards in academic work, and observe a standard of conduct appropriate for the college. Proper conduct is expected while on campus, off campus at college-leased or owned facilities, or attending activities that are sponsored, initiated, authorized, or supervised by J. Sargeant Reynolds Community College.

POLICY NO: 2-18 - TITLE: CLASSROOM INTERRUPTIONS
Faculty members have the discretion to determine what is appropriate classroom behavior for their class(es). Faculty members have the discretion to address disruptive student classroom behavior or medical emergencies in the classroom and are encouraged to immediately contact the Department of Police if a student is exhibiting unusual, suspicious, disruptive, or threatening behavior during classroom instruction.

POLICY NO: 2-19 - TITLE: ELECTRONIC DEVICES ON CAMPUS
The use of all electronic sound devices, with or without earphones, such as pagers, cellular telephones, electronic games, portable televisions, music devices (such as but not limited to radios, tape players, MP3 players), etc., is prohibited in laboratories, open computer laboratories, testing centers, academic support centers, student success centers, and libraries. Electronic devices generating disruptive sounds on campus, such as radios, boom boxes, auto sound systems, musical instruments, etc., are also prohibited.

POLICY NO: 4-3 - TITLE: EATING, DRINKING, AND SMOKING IN COLLEGE FACILITIES
Smoking is prohibited inside all college facilities. Smoking is only allowed in designated smoking areas outside of college facilities at each campus. These designated areas will have signage that distinguishes them. Eating, drinking and tobacco use of any kind are prohibited in the college's instructional laboratories and classrooms, unless exceptions are approved by the vice president of finance and administration or vice president of Community College Workforce Alliance. Eating and drinking are prohibited in The Jeanette S. Lipman Auditorium of the Massey Library Technology Center on the Parham Road Campus.

Rationale:

To examine, advanced automotive technologies, including electronic control systems found in Hybrid electric vehicle systems, battery electric vehicle systems and fuel cell electric vehicle systems. Perform diagnostic procedures and maintenance of electronic control system found in electric drive vehicles.
Safety will be emphasized.

See Course Outline below:

AUT 243
Automotive Control Electronics
Course Outline: (Subject to change)
Aut 243 Control Electronics

Hybrid Electric Vehicle Technology ATP eTextbook
ATP eTextbook: 279 pages, 197 illustrations, softcover
Download Size: 34.2 MB
eReader: Adobe Digital Editions

	Topic	Classroom	Lab
Week 1	Introductions/Safety/Fundamentals	Pre-Test Ch. 1 Introduction to HEV Technology	History Early Electronic Controls
Week 2	Unit 1 Introduction to Control Electronics	Ch. 12 Battery Construction	What is a Hybrid Types of Hybrids What is BEV Types of BEV
Week 3	Unit 1 Introduction to Control Electronics	Ch. 14 Battery Pack & Energy Mgt.	What is Fuel Cell EV Types of Fuel Cell EV Electric Motors
Week 4	Unit 2 Electric Drive Vehicle Safety Procedures	Safety	HV Safety Equipment First Responder Proc. Electric Shock Potential Prev. HV Current Flow Power Down HV Disconnect
Week 5	Unit 3 Electric Motors, Generators and Controls	Ch. 11 Energy Management	Fundamentals of Mag. Electric Motors Brushless Motors
Week 6	Unit 3 Electric Motors, Generators and Controls	Ch. 5 AC Induction Electric Machines	Motor Control Capacitors in HV Cont.
Week 7	Unit 3 Electric Motors, Generators and Controls	Ch. 6 Permanent Magnet Electric Machines	Converter/inverters Elec. Power Steering
Week 8	Unit 4 Hybrid Electric Vehicle Electronic Control Systems	Ch. 6 Permanent Magnet Electric Machines	Midterm
Week 9	Unit 4 Hybrid Electric Vehicle Electronic Control Systems	CH. 7 Power Inverter Systems	Toyota Prius Honda Civic Nissan
Week 10	Unit 4 Hybrid Electric Vehicle Electronic Control Systems	Ch. 8 Electric Propulsion Systems	Nissan
Week 11	Unit 4 Hybrid Electric Vehicle Electronic Control Systems	Ch. 15 Hybrid Veh. Braking Systems	Ford GM - Volt
Week 12	Unit 5 Battery Electric Vehicle Electronic Control Systems	Ch. 9 DC-DC Converter Systems	Solectria
Week 13	Unit 5 Battery Electric Vehicle Electronic Control Systems	Ch. 9 DC-DC Converter Systems	Ford Focus
Week 14	Unit 6 Fuel Cell Vehicle Electronic Control Systems	Fuel Cell	Simulator
Week 15	Unit 6 Fuel Cell Vehicle Electronic Control Systems	Fuel Cell	Simulator
Week 16	Final Exam Week	Final Exam	Wrap up projects

JSRCC Form 05-0003
Updated March 4, 2003

J. Sargeant Reynolds Community College

SYLLABUS FOR (AUT 253 – 4 credits)
ADVANCED AUTOMOTIVE TECHNOLOGY
ELECTRIC VEHICLES

Effective Date: SPRING 2012

Instructor: Lawrence Schwendeman **Office Phone:** 804-523-5938

Email: *lschwendeman@reynolds.edu* **Office Location:** # 252

Office Hours: M-F 1:00 PM- 5:00 PM
Need to list your hours here – Please do not put "see posted hours" because they will not be here to see them

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Textbook(s) (including laboratory manuals, workbooks, etc.):

Hybrid and Alternative Fuel Vehicles, 3/E
Halderman
©2013 | Prentice Hall | Published: 05/01/2012
ISBN-10: 013278484X | ISBN-13: 9780132784849

Learning activities (projects, papers, presentations, reading, oral participation, tests, etc.):

a) Each student will complete the assigned readings and class assignments
b) Each student will identify and understand the theory and functioning of Electric vehicle control systems.
c) Each student will identify and understand the theory and functioning of Electric vehicle components and systems.
d) Each student will perform First Responder Procedures on Electric vehicles.
e) The student will complete examinations on all major topics.
f) The student will view video/films pertaining to the subject matter.

Applicable learning resources (published materials--books, periodicals, informational packages, etc.; films, tapes, slides, specimen, models, charts, etc.):

a) Hybrid, Electric and Fuel-Cell Vehicles, Erjavec
b) Power Point slides for "Hybrid and Alternative Fuel Vehicles"

JSRCC Form 05-0003
Updated March 4, 2003

Evaluation (grading scale, make-up policy, etc.):	Attendance	= 10%	A = 91 – 100
	Unit exams and quizzes	= 25%	B = 81 – 90
	General lab performance	= 40%	C = 71 – 80
	Final exam	= 25%	D = 61 – 70
	Total	= 100%	F = 60 and below

Assessment: There will be a Final written exam.

Attendance requirements:

Attendance – 10% of grade.

Call in if you are unable to attend class – 523-5938

Attendance

Instructor must take face-to-face attendance in accordance with JSRCC Policy 1-3. To get credit for attendance, not only do you have to show up to class, but you must also be awake, not leave early without prior agreement nor wander in and out of the classroom, and participate in activities.

The only excused absences are as follows:

1) Illness demanding medical attention (written documentation will be necessary)

2) Emergency or death in family (written documentation will be necessary) anything other than these two will have to be discussed with instructor. Instructor has final say if absence will be excused or not.

Leaving class early without proper notice to the instructor could result in an absence. Do not schedule appointments during class time.

Attending class on time is very important. You are considered late if you arrive to class fifteen minutes or more after posted start time. Three times late to class equals one unexcused absence.

Two unexcused absences will constitute a reduction of one letter grade. (Example: A grade; two unexcused absence equals a grade of B, four absences equals a grade of C, etc.)

Attendance Certifications: Instructor is required by the college to send in Attendance Certifications twice during the semester: the first at the 15% point and the second at the 60% point. If you have not come to a face-to-face meeting at the 15% point (14 days after the official start date for classes), you will

be withdrawn as "Never Attended." If you have not emailed instructor or completed any assignments for the two weeks before the 60% point, you will be administratively "withdrawn" from the class. For those of you on financial aid, this is an issue. **Students who do not attend class at all prior to the drop date must be reported and will be *dropped.* Whereas, students who discontinue class attendance before the withdrawal date must be reported and will be *withdrawn.***

"In order to achieve the maximum benefit of this class, it is expected that you attend all classes. Per JSRCC's JSRCC Policy 1-3, Student Attendance, a record of your attendance will be maintained by the instructor and reported to the Admissions and Records office. If you do not attend class for a substantial amount of time, you may be subject to an adverse effect on your enrollment status in the class and/or your grade. It is your responsibility to inform the instructor of any anticipated absences. If you decide that you do not want to or cannot complete this course, it is recommended that you comply with the institution's drop or withdrawal policy by completing the appropriate forms in the Student Success Center by the appropriate deadline."

Schedule of class events--topics, tests, other learning activities:

Course Description:
This 4 cr. Class covers electric vehicle systems and advanced automotive electronics. Provides students an opportunity to perform diagnostic procedures and maintenance of electric vehicle systems. Teaches theory, function, and operation of electric vehicle systems. Focuses on safety. Prerequisites: Experience in the automotive repair field, AUT 241, AUT 242, AUT 245, and AUT 230. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week

General Course Purpose:
To examine theory, function, and maintenance of electric vehicle systems. Safety will be emphasized. Course is required with acceptance of the Department of Energy (DOE) grant and will be utilized in a new career studies certificate currently under development as part of the DOE grant.

Course Prerequisites/Co-requisites:
Prerequisites: Experience in the automotive repair field, AUT 241, AUT 242, AUT 245, and AUT 230. These prerequisites may be waived only with approval of the program head. There are no co-requisites.

Student Outcomes/Objectives - Instructor

a) Student will demonstrate knowledge of safety in all areas of Electric vehicle maintenance.
b) Student will have a basic understanding of principles of

elaboration of the expected student outcomes or specific course objectives (optional):	operation of Electric vehicle systems. c) Student will be able to identify and list various Electric vehicle components and their relationship to Electric propulsion system operation. d) Student will have a basic understanding of principles of operation of Electric vehicle systems. e) Student will be able to describe and identify different types of Electric vehicles.
Behavioral Requirements:	1. **Arrival/Departure:** Respect schedules, arrive/depart on time and notify your instructor when changes are necessary. 2. **Courtesy:** Acknowledge the presence of others, and be considerate of others while they work, study or speak. 3. **Distractions:** Turn off cell phones and other electronic devices in class. 4. **Exit:** Keep your classroom and lab areas clean, orderly, and ready for use by others. 5. **Participation:** Allow for a free exchange of ideas without interruption. 6. **Preparation:** Come prepared and focus on the business at hand. 7. **Respect:** Respect others, their opinions and opportunity to learn. 8. **No open toe shoes will be allowed at anytime, you will not be allowed to participate and will receive a zero for that day.** 9. **You are required to wear safety glasses when you are in the lab area at all times. Failure to comply will result in you not being allowed to participate and receiving a zero for that day.** 10. **Students are <u>NOT</u> permitted to work in the Labs without Instructor supervision. The Instructor must be present any time students are in the Lab. Student projects must be related to the course their enrolled in and have Instructor permission, (Signed, Blue Form) The only reason for allowing Student projects is to provide practical application for the course of instruction.**

Important Policies to Consider

The following are exerts from the Policy Manual. Please refer to policy number for a complete description and consequences of not complying with each policy.

POLICY NO: 1-35 - TITLE: STUDENT CONDUCT (see policy for description of violations)
Students are expected to obey the law, show respect for properly constituted authority, perform contractual obligations, maintain integrity and high standards in academic work, and observe a standard of conduct appropriate for the college. Proper conduct is expected while on campus, off campus at college-leased or owned facilities, or attending activities that are sponsored, initiated, authorized, or supervised by J. Sargeant Reynolds Community College.

POLICY NO: 2-18 - TITLE: CLASSROOM INTERRUPTIONS
Faculty members have the discretion to determine what is appropriate classroom behavior for their class(es). Faculty members have the discretion to address disruptive student classroom behavior or medical emergencies in the classroom and are encouraged to immediately contact the Department of Police if a student is exhibiting unusual, suspicious, disruptive, or threatening behavior during classroom instruction.

POLICY NO: 2-19 - TITLE: ELECTRONIC DEVICES ON CAMPUS
The use of all electronic sound devices, with or without earphones, such as pagers, cellular telephones, electronic games, portable televisions, music devices (such as but not limited to radios, tape players, MP3 players), etc., is prohibited in laboratories, open computer laboratories, testing centers, academic support centers, student success centers, and libraries. Electronic devices generating disruptive sounds on campus, such as radios, boom boxes, auto sound systems, musical instruments, etc., are also prohibited.

POLICY NO: 4-3 - TITLE: EATING, DRINKING, AND SMOKING IN COLLEGE FACILITIES
Smoking is prohibited inside all college facilities. Smoking is only allowed in designated smoking areas outside of college facilities at each campus. These designated areas will have signage that distinguishes them.
Eating, drinking and tobacco use of any kind are prohibited in the college's instructional laboratories and classrooms, unless exceptions are approved by the vice president of finance and administration or vice president of Community College Workforce Alliance. Eating and drinking are prohibited in The Jeanette S. Lipman Auditorium of the Massey Library Technology Center on the Parham Road Campus.

Rationale:

To examine, advanced automotive technologies, including electric vehicle systems and advanced automotive electronics. Perform diagnostic procedures and maintenance of Electric Vehicle Systems. Safety will be emphasized.

AUT 253
Advanced Automotive Technology
Course Outline: (Subject to change)
Aut 253 Electric Vehicles

Hybrid and Alternative Fuel Vehicles, 3/E
Halderman
©2013 | Prentice Hall | Published: 05/01/2012
ISBN-10: 013278484X | ISBN-13: 9780132784849

	Topic	Classroom	Lab
Week 1	Introductions/Safety/ History/Early EV	Pre-Test	
Week 2	Introduction to PHEV Vehicles • Overview of PHEV • Types/Levels of PHEV • Electric Motors	Ch. 1 Intro. To Hybrid	Vehicle Walk around
Week 3	PHEV Safety Procedures • HV Safety Equip. • First Responder Proc. • Electric Shock Pot. • Preventing HV Current Flow	Ch. 17 Hybrid Safety and Service Procedures Ch. 18 First Responder	HV Disconnect
Week 4	PHEV Batteries and Battery Service • Introduction • Battery Technology • HV Battery in the PHEV System	Ch. 7 Hybrid Auxiliary and HV Batteries	Battery Service
Week 5	PHEV Batteries and Battery Service • Auxiliary Battery in the Hybrid System • Lithium-Ion Battery Technology	Ch. 7 Hybrid Auxiliary and HV Batteries	Battery Service
Week 6	Electric Motors, Gen., & Controls • Fund. of Mag/Electromag, Induction • Electric Motors • Brushless Motors	Ch. 8 Electric Motors, Generators, and Controls	Electric Motor Testing
Week 7	Electric Motors, Gen., & Controls • Motor Control • Capacitors in PHEV Controllers • Converters /Inverters • Electric PS	Ch. 8 Electric Motors, Generators, and Controls	Electric Motor Testing
Week 8	Regenerative Braking Systems • Principles of Regenerative Braking • Regenerative Braking • Deceleration Rates	Ch. 9 Regenerative Braking	Midterm
Week 9	PHEV Transmissions and Transaxles • Manual vs. Automatic • Conventional A/T • CVT	Ch. 10 Hybrid Transmissions	A/T Diagnosing
Week 10	PHEV Heating and Air Conditioning • PHEV ICE Cooling and Cabin Heating • PHEV Electrical System Cooling • PHEV A/C Systems	Ch. 11 Hybrid HVAC	HVAC Diagnosing
Week 11	Electric Vehicle Conversion	Internet Reference	Trainer/Simulator
Week 12	Electric Vehicle Conversion	Internet Reference	Trainer/Simulator
Week 13	Electric Vehicle Conversion	Internet Reference	Trainer/Simulator
Week 14	Electric Vehicle Conversion	Internet Reference	Trainer/Simulator
Week 15	Electric Vehicle Conversion	Internet Reference	Trainer/Simulator
Week 16	Final Exam Week	Final Exam	Wrap up projects

Aut 253: Items highlighted in "yellow" indicate Environmentally Sustainable assignments.

JSRCC Form 05-0003
Updated March 4, 2003

J. Sargeant Reynolds Community College

SYLLABUS FOR (AUT 254 - 4 credits)
PLUG IN HYBRID VEHICELS – HYBRID

Effective Date: Fall 2013

Instructor: XXXXX **Office Phone:** XXXXX

Email: *@reynolds.edu* **Office Location:** *CCC*

Office Hours: Need to list your hours here – Please do not put "see posted hours" because they will not be here to see them

Textbook(s) (including laboratory manuals, workbooks, etc.):

Hybrid and Alternative Fuel Vehicles, 3/E
Halderman
©2013 | Prentice Hall | Published: 05/01/2012
ISBN-10: 013278484X | ISBN-13: 9780132784849

Learning activities (projects, papers, presentations, reading, oral participation, tests, etc.):

a) Each Learner will complete the assigned readings and class assignments
b) Each Learner will identify and understand the theory and functioning of Plug in Hybrid electric vehicle control systems.
c) Each Learner will identify and understand the theory and functioning of Plug in Hybrid vehicle components and systems.
d) Each Learner will perform First Responder Procedures on Plug In Hybrid electric vehicles.
e) The Learner will complete examinations on all major topics.
f) The Learner will view videos or web sites pertaining to the subject matter.

JSRCC Form 05-0003
Updated March 4, 2003

Applicable learning resources

a) CDX online resource
b) Various video's from many sources
c) Service Information on All Data
d) Service Information on Mitchell on Demand

Evaluation (grading scale, make-up policy, etc.):

Attendance	= 10%	A	= 91 – 100
Unit exams and quizzes	= 25%	B	= 81 – 90
General lab performance	= 40%	C	= 71 – 80
Final exam	= 25%	D	= 61 – 70
Total	= 100%	F	= 60 and below

Midterm assessment: There will be a Midterm and Final written exams.

Attendance requirements: Attendance – 10% of grade.

Call in if you are unable to attend class – 523-.54XX

Attendance

Instructor must take face-to-face attendance in accordance with JSRCC Policy 1-3. To get credit for attendance, not only do you have to show up to class, but you must also be awake, not leave early without prior agreement nor wander in and out of the classroom, and participate in activities.

The only excused absences are as follows:

1) Illness demanding medical attention (written documentation will be necessary)

2) Emergency or death in family (written documentation will be necessary) anything other than these two will have to be discussed with instructor. Instructor has final say if absence will be excused or not.

Leaving class early without proper notice to the instructor could result in an absence. Do not schedule appointments during class time.

Attending class on time is very important. You are considered late if you arrive to class fifteen minutes or more after posted start time. Three times late to class equals one unexcused absence.

Two unexcused absences will constitute a reduction of one letter grade. (Example: A grade; two unexcused absence equals a grade of B, four absences equals a grade of C, etc.)

Attendance Certifications: Instructor is required by the college to send in Attendance Certifications twice during the semester: the first at the 15% point and the second at the 60% point. If you have not come to a face-to-face meeting at the 15% point (14 days after the official start date for classes), you will be withdrawn as "Never Attended." If you have not emailed instructor or completed any assignments for the two weeks before the 60% point, you will be administratively "withdrawn" from the class. For those of you on financial aid, this is an issue. **Students who do not attend class at all prior to the drop date must be reported and will be *dropped.* Whereas, students who discontinue class attendance before the withdrawal date must be reported and will be *withdrawn.***

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Schedule of class events--topics, tests, other learning activities:

Course Description:
This 4 cr. Class covers plug-in hybrid electric vehicle systems, extended range electric vehicle systems, and advanced automotive electronics. Teaches theory, function, and operation of each plug-in hybrid vehicle system and provides students an opportunity to perform diagnostic procedures and maintenance on these vehicles. Focuses on safety. Prerequisites: Experience in the automotive repair field, AUT 241, AUT 242, AUT 245, and AUT 230 or approval of the program head. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose:
This course, which is required for the Hybrid and Electric Technology Career Studies Certificate, addresses the rapidly emerging automotive technology of plug-in hybrid vehicles, which automotive technicians are now being required to service. The course was

	developed with funding provided by a grant from the Department of Energy. **Course Prerequisites/Co-requisites**: Prerequisites: Experience in the automotive repair field, AUT 241, AUT 242, AUT 245, and AUT 230. These prerequisites may be waived only with approval of the program head.
Student Outcomes/Objectives - Instructor elaboration of the expected student outcomes or specific course objectives (optional):	**Course Objectives**(Each item should complete the following sentence.) Upon completing the course, the student will be able to a. demonstrate knowledge of safety in all areas of plug-in hybrid vehicle maintenance. b. explain principles of operation for plug-in hybrid vehicle systems. c. describe various plug-in hybrid vehicle components and their relationship to hybrid system operation. d. explain principles of operation for extended range electric vehicle systems. e. compare and contrast different types of extended range electric vehicles.
Behavioral Requirements:	1. **Arrival/Departure:** Respect schedules, arrive/depart on time and notify your instructor when changes are necessary. 2. **Courtesy:** Acknowledge the presence of others, and be considerate of others while they work, study or speak. 3. **Distractions:** Turn off cell phones and other electronic devices in class. 4. **Exit:** Keep your classroom and lab areas clean, orderly, and ready for use by others. 5. **Participation:** Allow for a free exchange of ideas without interruption. 6. **Preparation:** Come prepared and focus on the business at hand. 7. **Respect:** Respect others, their opinions and opportunity to learn. 8. **No open toe shoes will be allowed at anytime, you will not be allowed to participate and will receive a zero for that day.** 9. **You are required to wear safety glasses when you are in the lab area at all times. Failure to comply will result in you not being allowed to participate and receiving a zero for that day.** 10. **Students are NOT permitted to work in the Labs without Instructor supervision. The Instructor must be present any time students are in the Lab. Student projects must be related to the course their enrolled in and have Instructor permission, (Signed, Blue Form) The only**

reason for allowing Student projects is to provide practical application for the course of instruction.

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POLICY NO: 2-18 - TITLE: CLASSROOM INTERRUPTIONS

Faculty members have the discretion to determine what is appropriate classroom behavior for their class(es). Faculty members have the discretion to address disruptive student classroom behavior or medical emergencies in the classroom and are encouraged to immediately contact the Department of Police if a student is exhibiting unusual, suspicious, disruptive, or threatening behavior during classroom instruction.

POLICY NO: 2-19 - TITLE: ELECTRONIC DEVICES ON CAMPUS

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POLICY NO: 4-3 - TITLE: EATING, DRINKING, AND SMOKING IN COLLEGE FACILITIES

Smoking is prohibited inside all college facilities. Smoking is only allowed in designated smoking areas outside of college facilities at each campus. These designated areas will have signage that distinguishes them.

Eating, drinking and tobacco use of any kind are prohibited in the college's instructional laboratories and classrooms, unless exceptions are approved by the vice president of finance and administration or vice president of Community College Workforce Alliance. Eating and drinking are prohibited in The Jeanette S. Lipman Auditorium of the Massey Library Technology Center on the Parham Road Campus.

ON-LINE Expectations:

The Center for Distance Learning enables and supports learning options in a variety of settings through innovative, alternative delivery methods that provide access to learning opportunities from your home, office, or anywhere you have Internet access.
These options are designed to increase educational access to students for whom work schedules, family responsibilities, or other life demands restrict attendance at traditional on-campus classes. Online course work and interactions with the instructor and classmates are completed using the JSRCC Blackboard course management system.

SmarterMeasure
Learning readiness indicator
Formerly ROADI

Are you interested in taking Distance Learning courses at JSRCC? Take our assessment to see if you are ready for online learning.
The assessment will take approximately 45 minutes to complete. To take the assessment,

1. Be sure that you are already admitted as a student at JSRCC
2. Have your Student ID number on hand
3. Go to http://reynolds.smartermeasure.com/
4. Select the **current semester** as your Username.
5. Type in **Reynolds** as your Password

CDL001 — Orientation to Learning *Online*

All students who are **new to distance learning** are expected to complete **CDL001: Orientation to Learning Online** before the start of their first online course(s). **CDL001: Orientation to Learning Online** is a unique Orientation module that prepares students for learning at a distance.

1. COURSE PRE-REQUISITES

Learners should have a basic understanding of electricity works You should also have an understanding of electrical terms and concepts. Learners should also be comfortable using the Internet along with the basic operation of PCs, including installing software and browser plug-ins.

2. ENTRY LEVEL SKILLS/KNOWLEDGE

Participants need to be aware of the technology expectations in a distance courses.

2.1 Prerequisite Skills:

Learners in online classes must be proficient users of the World Wide Web and are responsible for adhering to all the following criteria. If you are unable to fulfill these requirements, then another class delivery method may be more appropriate for you.
1. You must be able to check the class Web site and your e-mail daily or every other day for most online classes.
2. You must have sufficient Internet access to do all the class activities, and you are responsible for finding alternative resources when necessary.
3. You must use an approved version of a Browser to perform all class Web activities (see “Software” later in this document).
4. You must have strong Internet research skills.
5. You must be able to perform the following Web browser functions:
   a. Locate and follow hyperlinks and navigate "back" and "forward"
   b. Add and access favorites/bookmarks so you can revisit important websites
   c. Edit your Web browser preferences
   d. Use the "Go" or “History” function to access recently visited pages
   e. Reload (refresh) the screen
   f. Print Web pages--adjust page setup and print options so that the URL (web address) and access date are printed on the page (it is a good idea to print all important pages or at least the

Within a week after your enrollment in your first online class, **CDL001** will appear as module within your Blackboard site. You can complete **CDL001** on your time and at a distance. The Orientation helps you to understand how typical online courses are structured, paced, and facilitated. You will have the opportunity to interact with a facilitator and with other students, as you prepare for learning at a distance.

Special Features of the JSRCC CDL001:

- The module can be completed within four to five days.
- The learning activities require a total time commitment of 4-6 hours.
- The entire module is delivered online, through Blackboard.
- The module is facilitated by a dedicated instructor.
- The module allows students to interact with other new distance learners.
- CDL001 "teaches by doing"; students learn how to use Blackboard tools while gaining study skills, time management skills, and other essential information necessary for independent learning.
- Students who successfully complete CDL001 receive a "Certificate of Completion" to share with their online instructors.

top levels of important sites to provide a record of your access)

g. Use your browser Help files for additional assistance

2.2 Research Skills:

Learners should possess computer skills to do online research using a variety of search engines; be familiar with your college's library website and available methods of obtaining articles and documents via J. Sargeant Reynolds' library resource site.

2.3 Writing and Communication Skills:

Learners should possess a firm command of written communication skills, including the mechanics of writing and grammar, the ability to organize thoughts, and the ability to demonstrate those skills in all written work.

Observation of "Netiquette": All your online communications need to be composed with fairness, honesty and tact. Spelling and grammar are very important in an online course. What you put into an online course reflects your level of professionalism. ***Several netiquette guidelines are listed below:***

Sentence Capitalization:

□ Typing in all caps is considered screaming and will NOT be tolerated

□ Example: **SUNDAY WILL BE A LONG DAY!**

□ Various studies have concluded that typing in all caps takes longer and is more difficult to read.

□ Recipient may think you are overly excited

Leaving the subject field blank:

□ Always fill in the subject with a concise statement describing the email.

□ Do not use all caps or put in phrases such as "Help" or "Hi".

□ Failure to follow netiquette guidelines when filling in the subject line of an email may result in your correspondence being discarded as spam.

Colored text and background colors:

□ Use colors sparingly in your emails – whether it is text or fill colors

□ Certain colors can make emails difficult to read.

Return receipt request:

□ Allows you to track when the recipient opens your email – you should use this email feature sparingly.
□ Can be very annoying to the recipient of the email.

Grammar and spelling check:

□ Proofread emails for errors
□ Capitalize your sentences and use appropriate punctuation
□ Refrain from using multiple !!!!!!! or ????????

These netiquette guidelines will help to ensure you are courteous and use proper manners while corresponding with your friends, family and business associates. Remember one point – someone is always watching or tracking your emails, just consult Col. Oliver North if you have doubts (deleted emails were used in the Iran Contra proceedings).

2.4 Computer Literacy:

Learners in online classes must be proficient with the basic functions of a word processor as listed below. If you are unable to fulfill these requirements, another class delivery method is more appropriate for you.
For word processing, the following software and skills are essential:
1. Approved Word processing software (note that Microsoft Works is not compatible with MS Word) or the ability to turn in assignments with a file extension of .doc, .docx, .rtf, or .pdf
2. Edit: copy, cut, paste, find, replace
3. Manage files using the directory system of the operating system (this encompasses creating new files and folders, as well as being able to navigate through your operating system and word processor to perform open, close, save, and save as functions).

2.4.1 Software:

Term	Definition
Certified	fully tested and supported
Compatible	key application areas tested
Not tested	specified Browser is not supported for the Operating System

Microsoft® Internet Explorer® Web Browsers

	Windows XP	Windows Vista Desktop	Mac OS 10.3	Mac OS 10.4	Mac OS 10.5
Internet Explorer 6	Compatible	Certified	Not Tested	Not Tested	Not Tested
Internet Explorer 7	Compatible	Certified	Not Tested	Not Tested	Not Tested

Mozilla® Firefox and Netscape® Navigator Web Browsers

Firefox 1.5 is not supported for Blackboard Academic Suite Release 8.0 and above. It is recommended that Firefox 1.5 users upgrade to Firefox 2.0 to access the latest security patches and Mozilla support.

	Windows XP	Windows Vista Desktop	Mac OS 10.3	Mac OS 10.4	Mac OS 10.5
Firefox 1.5	Not Supported	Not Supported	Compatible	Certified	Not Tested
Firefox 2.0	Certified	Certified	Not Tested	Certified	Compatible
Firefox 3.0	Compatible	Compatible	Compatible	Compatible	Compatible

Apple® Safari® Web Browsers

	Windows XP	Windows Vista Desktop	Mac OS 10.3	Mac OS 10.4	Mac OS 10.5
Safari 2	Not Tested	Not Tested	Not Tested	Certified	Certified
Safari 3	Not Tested	Not Tested	Not Tested	Compatible	Compatible

AUT 254
Advanced Automotive Technology

Hybrid and Alternative Fuel Vehicles, 3/E
Halderman
©2013 | Prentice Hall | Published: 05/01/2012
ISBN-10: 013278484X | ISBN-13: 9780132784849

Class Outline: (Subject to change)
Aut 254 Plug In Hybrid Vehicles

	Topic	Classroom	Lab
Week 1	Introductions/Safety/ History/Early EV	Pre-Test	
Week 2	Introduction to PHEV Vehicles • Overview of PHEV • Types/Levels of PHEV • Electric Motors	Ch. 1 Intro. To Hybrid	Vehicle Walk around
Week 3	PHEV Safety Procedures • HV Safety Equip. • First Responder Proc. • Electric Shock Pot. • Preventing HV Current Flow	Ch. 17 Hybrid Safety and Service Procedures Ch. 18 First Responder	HV Disconnect
Week 4	PHEV Batteries & Battery Ser. • Introduction • Battery Technology • HV Battery in the PHEV System	Ch. 7 Hybrid Auxiliary and HV Batteries	Battery Service
Week 5	PHEV Batteries & Battery Ser. • Auxiliary Battery in the Hybrid System • Lithium-Ion Battery Technology	Ch. 7 Hybrid Auxiliary and HV Batteries	Battery Service
Week 6	Motors, Gen., & Controls • Fund. of Mag/Electromag, Induction • Electric Motors • Brushless Motors	Ch. 8 Electric Motors, Generators, and Controls	Electric Motor Testing
Week 7	• Motors, Gen., & Controls Motor Control • Capacitors in PHEV Controllers • Converters /Inverters • Electric PS	Ch. 8 Electric Motors, Generators, and Controls	Electric Motor Testing
Week 8	Regenerative Braking Sys. • Principles of Regenerative Braking • Regenerative Braking • Deceleration Rates	Ch. 9 Regenerative Braking	Midterm
Week 9	PHEV Transmissions/ Transaxles • Manual vs. Automatic • Conventional A/T & CVT	Ch. 10 Hybrid Transmissions	A/T Diagnosing
Week 10	PHEV Heating and A/C • PHEV ICE Cooling and Cabin Heating • PHEV Electrical System Cooling • PHEV A/C Systems	Ch. 11 Hybrid HVAC	HVAC Diagnosing
Week 11	Honda PHEV Vehicles	Ch. 12 Honda	Honda Intro.
Week 12	Toyota/Lexus PHEV Vehicles	Ch. 13 Toyota/Lexus	Toyota Intro.
Week 13	Ford/Mercury PHEV Vehicles	Ch. 14 Ford/Mercury	Ford Intro.
Week 14	General Motors PHEV Veh.	Ch. 15 GM	GM F Intro.
Week 15	Other PHEV Hybrids Vehicles	Research other Mfg.	Various Intro.
Week 16	Final Exam Week	Final Exam	Wrap up projects

Aut 254: Items highlighted in "yellow" indicate Environmentally Sustainable

J. Sargeant Reynolds Community College

SYLLABUS FOR (AUT 256 – 4 credits)
ADVANCED AUTOMOTIVE TECHNOLOGY
FUEL CELL ELECTRIC VEHICLES

Effective Date: SPRING 2013

Instructor: Lawrence Schwendeman **Office Phone:** 804-523-5938

Email: lschwendeman@reynolds.edu **Office Location:** # 252

Office Hours: M-F 1:00 PM- 5:00 PM
Need to list your hours here – Please do not put "see posted hours" because they will not be here to see them

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Textbook(s) (including laboratory manuals, workbooks, etc.):

Hybrid and Alternative Fuel Vehicles, 3/E
Halderman
©2013 | Prentice Hall | Published: 05/01/2012
ISBN-10: 013278484X | ISBN-13: 978013278484849

Learning activities (projects, papers, presentations, reading, oral participation, tests, etc.):

a) Each student will complete the assigned readings and class assignments
b) Each student will identify and understand the theory and functioning of Electronic vehicle control systems.
c) Each student will identify and understand the theory and functioning of Electronic Control system components.
d) Each student will practice required safety procedures on electronic control system for electric drive vehicles.
e) The student will complete examinations on all major topics.
f) The student will view videos/films pertaining to the subject matter.

Applicable learning resources (published materials--books, periodicals, informational packages, etc.; films, tapes, slides, specimen, models, charts, etc.):

a) Hybrid, Electric and Fuel-Cell Vehicles, Erjavec
b) Power Point slides for "Hybrid and Alternative Fuel Vehicles"

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Updated March 4, 2003

Evaluation (grading scale, make-up policy, etc.):	Attendance	= 10%	A = 91 – 100
	Unit exams and quizzes	= 25%	B = 81 – 90
	General lab performance	= 40%	C = 71 – 80
	Final exam	= 25%	D = 61 – 70
	Total	= 100%	F = 60 and below

Midterm assessment: There will be a Midterm and Final written exams.

Attendance requirements:

Attendance – 10% of grade.

Call in if you are unable to attend class – 523-5938

Attendance

Instructor must take face-to-face attendance in accordance with JSRCC Policy 1-3. To get credit for attendance, not only do you have to show up to class, but you must also be awake, not leave early without prior agreement nor wander in and out of the classroom, and participate in activities.

The only excused absences are as follows:

1) Illness demanding medical attention (written documentation will be necessary)

2) Emergency or death in family (written documentation will be necessary) anything other than these two will have to be discussed with instructor. Instructor has final say if absence will be excused or not.

Leaving class early without proper notice to the instructor could result in an absence. Do not schedule appointments during class time.

Attending class on time is very important. You are considered late if you arrive to class fifteen minutes or more after posted start time. Three times late to class equals one unexcused absence.

Two unexcused absences will constitute a reduction of one letter grade. (Example: A grade; two unexcused absence equals a grade of B, four absences equals a grade of C, etc.)

Attendance Certifications: Instructor is required by the college to send in Attendance Certifications twice during the semester: the first at the 15% point and the second at the 60% point. If you have not come to a face-to-face meeting at the 15% point (14

days after the official start date for classes), you will be withdrawn as "Never Attended." If you have not emailed instructor or completed any assignments for the two weeks before the 60% point, you will be administratively "withdrawn" from the class. For those of you on financial aid, this is an issue. **Students who do not attend class at all prior to the drop date must be reported and will be *dropped.* Whereas, students who discontinue class attendance before the withdrawal date must be reported and will be *withdrawn.***

"In order to achieve the maximum benefit of this class, it is expected that you attend all classes. Per JSRCC's JSRCC Policy 1-3, Student Attendance, a record of your attendance will be maintained by the instructor and reported to the Admissions and Records office. If you do not attend class for a substantial amount of time, you may be subject to an adverse effect on your enrollment status in the class and/or your grade. It is your responsibility to inform the instructor of any anticipated absences. If you decide that you do not want to or cannot complete this course, it is recommended that you comply with the institution's drop or withdrawal policy by completing the appropriate forms in the Student Success Center by the appropriate deadline."

Schedule of class events--topics, tests, other learning activities:

Course Description:
A 4 cr. Class that introduces advanced automotive technologies, including hydrogen fuel cell electric vehicle systems and advanced automotive electronics. Teaches theory, function, and operation of fuel cell electric vehicles and provides students an opportunity to perform diagnostic procedures and maintenance for fuel cell electric vehicle systems. Focuses on safety. Prerequisite: AUT 245 or program head approval. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose:
Developed with funding provided by a grant from the Department of Energy, this course will serve as a requirement for the Advanced Automotive Technologies Career Studies Certificate. The course addresses the rapidly emerging automotive technologies of fuel cell power generation systems found in electric drive vehicles, which automotive technicians are now being required to service.

Course Prerequisites/Co-requisites:
Prerequisite: AUT 245 or program head approval

Student Outcomes/Objectives

a) Student will demonstrate knowledge of safety in all areas of electronic controls for electric drive vehicle

- Instructor elaboration of the expected student outcomes or specific course objectives (optional):	maintenance. b) Student will have a basic understanding of principles of electronic control systems operation for electric drive vehicles. c) Student will be able to identify and list various electronic control systems components and their relationship to electric drive vehicles operation. d) Student will have a basic understanding of the principles of control systems and their relationship to electric drive vehicles systems. e) Student will be able to describe and identify different types of electronic control systems for electric drive vehicles.

Behavioral Requirements:	1. **Arrival/Departure:** Respect schedules, arrive/depart on time and notify your instructor when changes are necessary. 2. **Courtesy:** Acknowledge the presence of others, and be considerate of others while they work, study or speak. 3. **Distractions:** Turn off cell phones and other electronic devices in class. 4. **Exit:** Keep your classroom and lab areas clean, orderly, and ready for use by others. 5. **Participation:** Allow for a free exchange of ideas without interruption. 6. **Preparation:** Come prepared and focus on the business at hand. 7. **Respect:** Respect others, their opinions and opportunity to learn. 8. **No open toe shoes will be allowed at anytime, you will not be allowed to participate and will receive a zero for that day.** 9. **You are required to wear safety glasses when you are in the lab area at all times. Failure to comply will result in you not being allowed to participate and receiving a zero for that day.**

Important Policies to Consider

The following are exerts from the Policy Manual. Please refer to policy number for a complete description and consequences of not complying with each policy.
POLICY NO: 1-35 - TITLE: STUDENT CONDUCT (see policy for description of violations)

Students are expected to obey the law, show respect for properly constituted authority, perform contractual obligations, maintain integrity and high standards in academic work, and observe a standard of conduct appropriate for the college. Proper conduct is expected while on campus, off campus at college-leased or owned facilities, or attending activities that are sponsored, initiated, authorized, or supervised by J. Sargeant Reynolds Community College.

POLICY NO: 2-18 - TITLE: CLASSROOM INTERRUPTIONS

Faculty members have the discretion to determine what is appropriate classroom behavior for their class(es). Faculty members have the discretion to address disruptive student classroom behavior or medical emergencies in the classroom and are encouraged to immediately contact the Department of Police if a student is exhibiting unusual, suspicious, disruptive, or threatening behavior during classroom instruction.

POLICY NO: 2-19 - TITLE: ELECTRONIC DEVICES ON CAMPUS

The use of all electronic sound devices, with or without earphones, such as pagers, cellular telephones, electronic games, portable televisions, music devices (such as but not limited to radios, tape players, MP3 players), etc., is prohibited in laboratories, open computer laboratories, testing centers, academic support centers, student success centers, and libraries. Electronic devices generating disruptive sounds on campus, such as radios, boom boxes, auto sound systems, musical instruments, etc., are also prohibited.

POLICY NO: 4-3 - TITLE: EATING, DRINKING, AND SMOKING IN COLLEGE FACILITIES

Smoking is prohibited inside all college facilities. Smoking is only allowed in designated smoking areas outside of college facilities at each campus. These designated areas will have signage that distinguishes them. Eating, drinking and tobacco use of any kind are prohibited in the college's instructional laboratories and classrooms, unless exceptions are approved by the vice president of finance and administration or vice president of Community College Workforce Alliance. Eating and drinking are prohibited in The Jeanette S. Lipman Auditorium of the Massey Library Technology Center on the Parham Road Campus.

Rationale:

To examine, advanced automotive technologies, including electronic control systems found in Hybrid electric vehicle systems, battery electric vehicle systems and fuel cell electric vehicle systems. Perform diagnostic procedures and maintenance of electronic control system found in electric drive vehicles.
Safety will be emphasized.

See Course Outline below:

AUT 256
Advanced Automotive Technology
Course Outline: (Subject to change)
Aut 256 Fuel Cell Electric Vehicles

Hybrid and Alternative Fuel Vehicles, 3/E
Halderman
©2013 | Prentice Hall | Published: 05/01/2012
ISBN-10: 013278484X | ISBN-13: 9780132784849

	Topic	Classroom	Lab
Week 1	Introductions/Safety	Pre-Test	
Week 2	Unit 1 Introduction to Fuel Cell Electric Vehicles	Ch. 2 Introduction to Hybrid Vehicles	What is a Hybrid Types of Hybrids What is BEV Types of BEV
Week 3	Unit 1 Introduction to Fuel Cell Electric Vehicles	Ch. 2 Introduction to Hybrid Vehicles	What is Fuel Cell EV Types of Fuel Cell EV Electric Motors
Week 4	Unit 2 Electric Drive Vehicles Safety Procedures	Ch. 17 Hybrid Safety and Service Procedures Ch. 18 First Responder	HV Safety Equipment First Responder Proc. Electric Shock Potential Prev. HV Current Flow Power Down HV Disconnect
Week 5	Unit 3 Electric Motors, Generators and Controls	Ch. 8 Electric Motors, Generators & Controls	Fundamentals of Mag. Electric Motors Brushless Motors
Week 6	Unit 3 Electric Motors, Generators and Controls	Ch. 8 Electric Motors, Generators & Controls Ch. 9 Regenerative Brk.	Motor Control Capacitors in HV Cont.
Week 7	Unit 3 Electric Motors, Generators and Controls	Ch. 8 Electric Motors, Generators & Controls	Converter/inverters Elec. Power Steering
Week 8	Unit 4 Fuel Cell Electric Vehicles	Ch. 16 Fuel Cells and Advanced Technologies	Midterm
Week 9	Unit 4 Fuel Cell Electric Vehicles	Ch. 16 Fuel Cells and Advanced Technologies	Simulator/Trainer
Week 10	Unit 4 Fuel Cell Electric Vehicles	Ch. 16 Fuel Cells and Advanced Technologies	Simulator/Trainer
Week 11	Unit 5 Battery Electric Vehicle Electronic Control Systems	Ch. 13 Toyota Ch. 15 GM	Chevrolet Volt Toyota Prius
Week 12	Unit 5 Battery Electric Vehicle Electronic Control Systems	Ch. 8 Electric Motors, Generators & Controls	Nissan Leaf Solectria
Week 13	Unit 6 Fuel Cell Electric Vehicle Electronic Control Systems	Ch. 16 Fuel Cells and Advanced Technologies	Simulator/Trainer
Week 14	Unit 6 Fuel Cell Electric Vehicle Electronic Control Systems	Ch. 16 Fuel Cells and Advanced Technologies	Simulator/Trainer
Week 15	Unit 6 Fuel Cell Electric Vehicle Electronic Control Systems	Ch. 16 Fuel Cells and Advanced Technologies	Simulator/Trainer
Week 16	Final Exam Week	Final Exam	Wrap up projects

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