Syllabus for AT-28

Course Information

Semester & Year: Spring 2022
Course ID & Section #: AT-28-E3034
Instructor's name: Anibal Florez
Day/Time of required meetings: Tuesdays & Thursdays 5:45pm to 10:05pm
Location: AT-128 for lecture and then AT-129 for lab
Number of proctored exams: No proctored exams.
Course units: 4

Instructor Contact Information

Office location: AT-141
Office hours: By Appointment is preferred but If I'm there just stop by.
Phone number: 707-476-4373
Email address: Anibal-Florez@redwoods.edu

Catalog Description

A course covering advanced theory and principles of engine performance related topics. Topics will include internal engine processes, fuel injection systems, electronic ignition, coil over plug (COP) systems, evaporative emission systems, exhaust gas recirculation, catalytic converters, computer controlled emission systems including OBD II compliant and CAN/BUS systems. The laboratory portion of the course will focus on diagnosis and repair of engine mechanical problems, common driveability related problems. Five gas analysis, scantools, digital storage oscilloscopes (DSOs) graphing multimeters (GMM), and common electronic test equipment will be used extensively in the course. The course is designed in conjunction with Automotive Service Excellence (ASE) Education Foundation standards and will in part prepare the student for the ASE Engine Performance Certification Examination.

Course Student Learning Outcomes

1. Retrieve and analyze data with a scantool
2. Diagnose and repair computerized engine controls
3. Perform oscilloscope waveform analysis

Prerequisites/co-requisites/ recommended preparation

Must pass AT-24 Engine performance before enrolling in AT-28.

Textbook information

Title & Edition: Automotive Engine Performance 5th Ed

Author: James Halderman

ISBN-13: 978-0-13-407497-7; Plus additional hand-out reading material.

Accessibility

College of the Redwoods is committed to making reasonable accommodations for qualified students with disabilities. If you have a disability or believe you might benefit from disability-related services and accommodations, please contact your instructor or Disability Services and Programs for Students (DSPS). Students may make requests for alternative media by contacting DSPS based on their campus location:

- Eureka: 707-476-4280, student services building, 1st floor

If you are taking online classes DSPS will email approved accommodations for distance education classes to your instructor. In the case of face-to-face instruction, please present your written accommodation request to your instructor at least one week before the needed accommodation so that necessary arrangements can be made. Last minute arrangements or post-test adjustments usually cannot be accommodated.

Student Support

Good information and clear communication about your needs will help you be successful. Please let your instructor know about any specific challenges or technology limitations that might affect your participation in class. College of the Redwoods wants every student to be successful.

Admissions deadlines & enrollment policies

Spring 2022 Dates

- *Classes begin: 01/15/22*
- *Last day to add a class: 01/21/22*
- *Martin Luther King, Jr's Birthday (all campuses closed: 01/17/22*
- *Last day to drop without a W and receive a refund: 01/28/22*
- *Census date (or 20% into class duration): 01/31/22*
- *Last Day to file P/NP (only courses where this is an option) 02/11/22*
- *Lincoln's Birthday (all campuses closed): 02/18/22*
- *Presidents Day (all campuses closed): 02/21/22*
- *Last day to petition to graduate or apply for certificate: 03/03/22*
- *Spring Break (no classes): 03/14/22-03/19/22*
- *Last day for student-initiated W (no refund): 04/01/22*
- *Last day for faculty-initiated W (no refund): 04/01/22*
- *Final examinations: 05/07/22-05/13/22*
- *Semester ends: 05/13/22*
- *Grades available for transcript release: approximately 05/30/22*

Academic dishonesty

In the academic community, the high value placed on truth implies a corresponding intolerance of scholastic dishonesty. In cases involving academic dishonesty, determination of the grade and of the student's status in the course is left primarily to the discretion of the faculty member. In such cases,

where the instructor determines that a student has demonstrated academic dishonesty, the student may receive a failing grade for the assignment and/or exam and may be reported to the Chief Student Services Officer or designee. The Student Code of Conduct (AP 5500) is available on the College of the Redwoods website. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the College Catalog and on the College of the Redwoods website.

Disruptive behavior

Student behavior or speech that disrupts the instructional setting will not be tolerated. Disruptive conduct may include, but is not limited to: unwarranted interruptions; failure to adhere to instructor's directions; vulgar or obscene language; slurs or other forms of intimidation; and physically or verbally abusive behavior. In such cases where the instructor determines that a student has disrupted the educational process, a disruptive student may be temporarily removed from class. In addition, the student may be reported to the Chief Student Services Officer or designee. The Student Code of Conduct (AP 5500) is available on the College of the Redwoods website. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the College Catalog and on the College of the Redwoods website.

Inclusive Language in the Classroom

College of the Redwoods aspires to create a learning environment in which all people feel comfortable in contributing their perspectives to classroom discussions. It therefore encourages instructors and students to use language that is inclusive and respectful.

Setting Your Preferred Name in Canvas

Students have the ability to have an alternate first name and pronouns to appear in Canvas. Contact Admissions & Records to request a change to your preferred first name and pronoun. Your Preferred Name will only be listed in Canvas. This does not change your legal name in our records. See the Student Information Update form.

Canvas Information

If using Canvas, include navigation instructions, tech support information, what Canvas is used for, and your expectation for how regularly students should check Canvas for your class.
Log into Canvas at https://redwoods.instructure.com
Password is your 8 digit birth date
For tech help, email its@redwoods.edu or call 707-476-4160
Canvas Help for students: https://webapps.redwoods.edu/tutorial/
Canvas online orientation workshop: Canvas Student Orientation Course (instructure.com)

Community College Student Health and Wellness

Resources, tools, and trainings regarding health, mental health, wellness, basic needs and more designed for California community college students, faculty and staff are available on the California Community Colleges Health & Wellness website.

Wellness Central is a free online health and wellness resource that is available 24/7 in your space at your pace.

Students seeking to request a counseling appointment for academic advising or general counseling can email counseling@redwoods.edu.

Emergency procedures / Everbridge

College of the Redwoods has implemented an emergency alert system called Everbridge. In the event of an emergency on campus you will receive an alert through your personal email and/or phones. Registration is not necessary in order to receive emergency alerts. Check to make sure your contact information is up-to-date by logging into WebAdvisor https://webadvisor.redwoods.edu and selecting 'Students' then 'Academic Profile' then 'Current Information Update.'

Please contact Public Safety at 707-476-4112 or security@redwoods.edu if you have any questions. For more information see the Redwoods Public Safety Page.

In an emergency that requires an evacuation of the building anywhere in the District:

- Be aware of all marked exits from your area and building
- Once outside, move to the nearest evacuation point outside your building
- Keep streets and walkways clear for emergency vehicles and personnel

Do not leave campus, unless it has been deemed safe by the campus authorities.

Eureka Campus Emergency Procedures

Please review the campus emergency map for evacuation sites, including the closest site to this classroom (posted by the exit of each room). For more information on Public Safety go to the Redwoods Public Safety Page It is the responsibility of College of the Redwoods to protect life and property from the effects of emergencies within its own jurisdiction.

In the event of an emergency:

1. Evaluate the impact the emergency has on your activity/operation and take appropriate action.
2. Dial 911, to notify local agency support such as law enforcement or fire services.
3. Notify Public Safety 707-476-4111 and inform them of the situation, with as much relevant information as possible.
4. Public Safety shall relay threat information, warnings, and alerts through the Everbridge emergency alert system, Public address system, and when possible, updates on the college website, to ensure the school community is notified.
5. Follow established procedures for the specific emergency as outlined in the College of the Redwoods Emergency Procedure Booklet, (evacuation to a safe zone, shelter in place, lockdown, assist others if possible, cooperate with First Responders, etc.).
6. If safe to do so, notify key administrators, departments, and personnel.
7. Do not leave campus, unless it is necessary to preserve life and/or has been deemed safe by the person in command.

Student Support Services

The following online resources are available to support your success as a student:

- CR-Online (Comprehensive information for online students)
- Library Articles & Databases
- Canvas help and tutorials
- Online Student Handbook

Counseling offers assistance to students in need of professional counseling services such as crisis counseling.

Learning Resource Center includes the following resources for students

- Academic Support Center for instructional support, tutoring, learning resources, and proctored exams. Includes the Math Lab & Drop-in Writing Center
- Library Services to promote information literacy and provide organized information resources.
- Multicultural & Diversity Center

Special programs are also available for eligible students include

- Extended Opportunity Programs & Services (EOPS) provides services to eligible income disadvantaged students including: textbook award, career academic and personal counseling, school supplies, transportation assistance, tutoring, laptop, calculator and textbook loans, priority registration, graduation cap and gown, workshops, and more!
- The TRiO Student Success Program provides eligible students with a variety of services including trips to 4-year universities, career assessments, and peer mentoring. Students can apply for the program in Eureka or in Del Norte
- The Veteran's Resource Center supports and facilitates academic success for Active Duty Military, Veterans and Dependents attending CR through relational advising, mentorship, transitional assistance, and coordination of military and Veteran-specific resources.
- Klamath-Trinity students can contact the CR KT Office for specific information about student support services at 530-625-4821

Technology

Each student must be aware of the technological requirements to be successful in this class.

Each student will be responsible for completing tasks online via CANVAS. This includes homework, watching videos and or recorded lecture materials, and possibly communicating with your instructor as well as other students. This is in addition to our time together in both the lecture room and shop.

This means that students will have a greater chance of success with a laptop or home computer and access to WiFi.

This course requires adequate computer skills. If you are worried about your computer skills, please let me know, because I can help. But to check yourself before we get started, you should be able to:

- navigate a class in Canvas
- receive and respond to messages sent to your CR email account (People! - this means you need to CHECK your CR email!)

- use a word processor program (such as Microsoft Word or Google Docs)

It is your responsibility to meet the technological demands of the course, which may often include troubleshooting technological adventures.

Communication Guidelines

- Response times to emails and messages – in general I will reply within a couple of business days.
- My general availability – Office hours by appointment, email and phone anytime.
    - I prefer emails but you can call my office anytime. Emails are usually the better way.
- Come on by! Even if it's outside of any office hour scheduled.
- Timeline for offering substantive feedback on assignments – in general about a week.
- Expectations for how students should engage with each other – You are all peers taking part in the same automotive program. Each of you have different skill sets and knowledge. Everyone, including me, will benefit from open and honest communication that is respectful and encouraging. We are all in this together, let us bring each other up.

If you have a question or concern, please, please, PLEASE get ahold of me. I am very available to help you, especially as you work to figure out how to be successful in this online class. So, if you have a question, here are some guidelines to follow:

- **Might your question benefit other people in the class?** Then please post it in the related discussion forum in Canvas. This forum is included in every module in the course, so it will be easy for you to find, and I will check it at least once a day during the week and at least once over the weekend.
- **Is your message private?** Please send me a message using the messaging tool in Canvas (just click on the INBOX button in the left toolbar). You are also welcome to email me.

You can also always call me on my "on campus" office phone (707-476-4373). Regardless of how you reach out, if you don't hear back from me within 48 hours of sending your message, you can assume I did not receive it (or it got lost in my chaos)…so please resend.
Finally, **please be polite.** In person its proper etiquette in an online environment, this is called **netiquette**. Sometimes it is difficult to convey nuance or humor through written (electronic) communication. Just be respectful to your classmates and be kind, considerate, and forgiving in all of your posts in the discussion forums. Adhere to the same standards of behavior online that you follow in real life, because you don't want to forget: Real humans read your posts. After all, our Canvas space is our classroom, and we want to create a positive, collaborative, interesting community.

Note: Additional policies may be added as I deem necessary to provide you with the best learning environment possible.

Instructor Expectations of Students

Your commitment will require your time. A typical three credit hour class will require about nine hours per week of your time. You will need to carefully listen to lectures and carefully read textbook chapters, participate in both classroom and shop activities, complete quizzes and tests including the final exam. Conscientiousness, attention to details, and skills in reading and writing are critical for success in any endeavor.

Student Expectations of Instructor

I post most lectures regularly for you review and prepare weekly classroom and shop activities. I will access the class website regularly and respond to posted questions and messages. Additionally, I read every chapter I assign and expect a discussion from your questions in class the next day we meet. There is also regular instructor-based communication via announcements, lectures, feedback to any discussion posts, completed labs, homework, and email/message students who fall behind.

Supplies

1. Each student is required to purchase in advance and have available a #2 pencil or pen.
2. Safety glasses are required for all lab activities. Students are required to purchase OSHA/ANSI approved safety glasses and wear them at all times when working in the lab.
3. Work attire is recommended. Supply your own coveralls, shop coat or work pants, shirt and closed toed shoes.
4. Class textbook(s).
5. Each student should be prepared to supply any additional personal protective equipment not furnished by the college.

Course Requirements

1. Complete the assignments and tests – Read assigned chapters prior to coming to class.
2. Access to the internet to actively participate in online assignments.
3. Actively participate in shop assignments while striving for improvement.
4. Refrain from using personal electronic devices unless it pertains to the class.
5. Must use safety glasses.
6. Everyone will comply with the latest COVID-19 Social Distancing and Safety Guidelines.
7. No student parking allowed in the automotive compound unless otherwise discussed.

Degree/Certificate

An Associate of Science Degree in Automotive Technology is available as well as Certificates of Achievement. For more information consult the college catalog for specific requirements and/or contact Counseling/Advising at 476-4150 to develop a student education plan.

Automotive Work Experience

Additional units are available for working in the field. Contact the Work Experience Coordinator at 476-4341

Course Evaluation

Your performance objectives, exams, and laboratory activities will be translated to points and points to grades. There are 1000 possible points and the following distribution will guarantee the following:

1000 - 900 = A
899 - 800 = B
799 - 700 = C
699 - 600 = D
599 - 500 = F

Course Schedule

This class is scheduled to meet Monday and Wednesday mornings at 8:15am and will conclude at 12:35pm. During our allotted time we will go over assigned textbook material, work through classroom review exercises and finally discuss shop activities and conclude with hands on application in the shop.

Attendance

The college assumes that students will attend every session of a class for which they are registered. If, however, attendance is irregular, students may be dropped from a class. Excessive absence is defined as a total of absences which equal two weeks in a 16 week semester, for a class meeting twice per week that would equate to 4 absences. For attendance purpose, the college regards a laboratory session as the equivalent of one class meeting.

Veterans and financial aid recipients should remember that should they drop below the number of units required of them by the Veterans Administration or financial aid office for any reason during the semester, including being dropped from a class for excessive absences, they will lose part of the government assistance allowances and may be required to repay funds already disbursed.

In any event if an attendance problem does develop, work with the instructor to resolve it. The purpose here is to see what we can do together to keep you in the class in order to help you master the course content.

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 will be dropped from this class by the instructor, no exceptions.**
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.

Course Objectives

Upon successful completion of this course the student should be able to perform the following tasks listed on the ASE Website:

ENGINE PERFORMANCE

A. General: Engine Diagnosis

1. Identify and interpret engine performance concerns; determine necessary action. P-1

2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1

6. Perform cylinder power balance test; determine necessary action. P-2

9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2

10. Verify engine operating temperature; determine necessary action. P-1

11. Verify correct camshaft timing. P-1

ENGINE PERFORMANCE

B. Computerized Controls Diagnosis and Repair

1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. P-1

2. Access and use service information to perform step-by-step (troubleshooting) diagnosis. P-1

3. Perform active tests of actuators using a scan tool; determine necessary action. P-2

4. Describe the importance of running all OBDII monitors for repair verification. P-1

5. Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data. P-1

6. Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action. P-1

7. Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action. P-2

8. Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM installed accessories, or similar systems); determine necessary action. P-3

ENGINE PERFORMANCE

C. Ignition System Diagnosis and Repair

1. Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action. P-2

2. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action. P-1

3. Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary. P-3

ENGINE PERFORMANCE

D. Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair

1. Diagnose (troubleshoot) hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action. P-2

2. Check fuel for contaminants; determine necessary action. P-2

3. Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action. P-1

6. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air. P-2

7. Inspect and test fuel injectors. P-2

8. Verify idle control operation. P-1

9. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action. P-1

11. Perform exhaust system back-pressure test; determine necessary action. P-2

ENGINE PERFORMANCE
E. Emissions Control Systems Diagnosis and Repair

3. Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action. P-3

4. Diagnose emissions and driveability concerns caused by the secondary air injection and catalytic converter systems; determine necessary action. P-2

5. Diagnose emissions and driveability concerns caused by the evaporative emissions control system; determine necessary action. P-2

6. Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action. P-2

8. Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action. P-3

9. Inspect and test catalytic converter efficiency. P-2

11. Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action. P-3

AT 28
Advanced Engine Performance

Course Grading System

Theory Portion

Test I	Engine Mechanical Teardown, Inspections and Rebuild	75 points
Test II	Computer Signals	75 points
Test III	DIS/COP	75 points
Test IV	Specific System Testing	75 points
Final Exam Comprehensive		120 points
Total possible Points		**420 points**

Extra Credit
Each student may elect independently to read and report on a topic related to advanced engine performance class from a source other than the course text or the internet i.e. trade publications, library reference material, magazines, newspaper articles, etc... .The report must be no less than one page typed, normal 12 point font and no longer than three pages. 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 and agree on a topic prior to doing this assignment.

Group Research Project & Class presentation- 160 points

Laboratory Portion

(A) Mechanical Measurement Skills	75 points
(B) Scan tool and DMM Use Skills	75 points
(C) DSO/OBD II Use Skills	75 points
(D) Major Repairs	75 points
(E) Diagnostic Exercises	120 points
Total Possible Points	**420 points**

Semester Schedule

Date	Assigned Reading	Lab
1/18/2022	Hand outs Chp. 7, 11	Engine Block
1/20/2022	Hand outs Chp 26, 28	Engine Block
1/25/2022	Hand outs Chp 29, 31	Engine Block
1/27/2022	Hand outs Chp 29, 31	Engine Block
2/1/2022	Hand outs Chp. 24, 25, 30	Engine Block
2/3/2022	Hand outs Chp. 34, 35	Engine Block
2/8/2022	Review	Engine Block
2/10/2022	***Test 1 Engine Measurements***	
2/15/2022	Text Chp 20-25, Hand Out Chp 3	Scan tool and DMM
2/17/2022	Text Chp 20-26, Hand Out Chp 3	Diagnostic Exercises
2/22/2022	Text Chp 20-27, Hand Out Chp 3	Scan tool and DMM
2/24/2022	Text Chp 20-28, Hand Out Chp 3	Diagnostic Exercises
3/1/2022	Review	Diagnostic Exercises
3/3/2022	***Test 2 Computer Signals***	
3/8/2022	Text Chp 18, 19; Hand out Chp5	Tentative- DSO/OBD II
3/10/2022	Text Chp 18, 19; Hand out Chp5	Tentative- Diagnostic Exercises
3/15/2022	***Spring Break***	
3/17/2022	***Spring Break***	
3/22/2022	Text 16, 17; Hand out Chp 4	DIS/COP
3/24/2022	Text 16, 17; Hand out Chp 4	Diagnostic Exercises
3/29/2022	Text 16, 17; Hand out Chp 4	DIS/COP
3/31/2022	Review	Diagnostic Exercises
4/5/2022	***Test 3 DIS/COP Systems***	
4/7/2022	Text Chp 10, 27, 30	Specific system testing
4/12/2022	Text Chp 10, 27, 30	Diagnostic Exercises
4/14/2022	Text Chp 10, 27, 30	Specific system testing
4/19/2022	Text Chp 10, 27, 30	Diagnostic Exercises
4/21/2022	Group Project Presentations	Major Repairs
4/26/2022	Group Project Presentations	Major Repairs
4/28/2022	Group Project Presentations	Major Repairs
5/3/2022	Group Project Presentations/Review	Major Repairs
5/5/2022	***Test 4 System Testing***	
5/10/2022	***FINAL EXAM @ 5:30pm***	