

AT-24 Engine Performance

Course Information

Semester & Year: Spring 2025

Course ID and Section number: AT-24-E7631

Instructor's name: Ernest Shull

Day and time of required meetings: Mondays & Wednesdays 8:15-12:35

Location: AT-128

Course units: 4

Instructor Contact Information

Office location: AT-122

Office hours: Open Door Policy

Phone number: 707-476-4221

Email address: ernest-shull@redwoods.edu

Catalog Description

A course covering theory and principles of engine performance related topics. Topics will include the internal combustion process, compression ratios, combustion efficiency, volumetric efficiency, airflow requirements, air-fuel ratios, fuel delivery systems, manifolds, electronic distributor ignition systems, oscilloscope waveform interpretation, ignition timing and advance strategies. The laboratory portion of the course will focus on diagnosis and repair of the following engine performance related problems; mechanical problems, computerized engine control systems, ignition systems, fuel delivery systems, and emission systems. The course is designed in conjunction with Automotive Service Excellence (ASE) standards and subsequently will in part prepare the student for the ASE Engine Performance Certification Examination.

Course Student Learning Outcomes

- Perform general engine diagnosis
- Diagnose and repair computerized engine controls
- Diagnose and repair emission control systems

Educational Accessibility & Support

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

- Mental health conditions such as depression, anxiety, PTSD, or bipolar disorder
- Common ailments such as arthritis, asthma, diabetes, autoimmune disorders, and diseases
- Temporary impairments such as a broken bone, recovery from significant surgery, or a

- pregnancy-related disability
- Neurodevelopmental disorders such as a learning disability, intellectual disability, autism, acquired brain injury, or ADHD
- Vision, hearing, or mobility conditions

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

SASS office locations and phone numbers

Eureka campus

- Phone: 707-476-4280
- Location: Student Services building, first floor SS113

Del Norte campus

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

Klamath-Trinity campus

- Phone: 707-476-4280

Student Support Services

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.

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

[CR Online Learning Support](#)

Tech support, laptop loans, guides to using Canvas, installing Office 365 for free, and more.

[Library Articles & Databases](#)

Find the best library databases for your research.

[Online Tutoring Resources](#)

Participate in tutoring over Zoom.

To learn more about the resources available to you, click on a title bar below, or click the down arrow to expand them all.

Klamath-Trinity students can contact the CR Klamath-Trinity Office for specific information about student support services at 530-625-4821.

Community College Student Health and Wellness

National Suicide Prevention Lifeline

If you are in distress or are with someone at risk right now, call or text the National Suicide Prevention Lifeline.

Call the National Suicide Prevention Lifeline

1-800-273-TALK (8255)

Text the National Suicide Prevention Lifeline

741-741

Timely Care

When you're not feeling well physically or distressed mentally, Timely Care can offer the help you're looking for in just a few quick taps. Students can schedule an appointment anytime via phone, video, and chat. [Log in or set up an account with Timely Care.](#)

Mental Health Counseling

Students should text, email, or fax Shawna Bell directly for scheduling and/or services.

- Text: 707-496-2856
- Email: shawnabmft@gmail.com
- Fax and voicemail: 707-237-2318

Wellness Central

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 [Wellness Central](#).

Counseling

[Counseling and Advising](#) can assist students in need of academic advising and professional counseling services. Call, email or stop by one of our offices to make an appointment!

Counseling and Advising office locations and contact info

Eureka campus

- Phone: 707-476-4150
- Location: Student Services Building, first floor
- Email: counseling@redwood.edu
- Hours: Monday through Friday, 9am to 4pm. Summer hours may vary

Del Norte campus

- Phone: 707-476-2300

- Location: Main Building, next to the library
- Hours: Summer hours may vary

Klamath-Trinity campus

- Phone: 530-625-4821
- Email: KT-staff@redwoods.edu
- Hours: Summer hours may vary

Basic Needs Center

[Basic Needs Center](#) provides for the health and safety of students by providing access to healthy food, financial resources, and referrals to safe and secure housing. [Submit a request for services and information.](#)

Basic Needs Center contact info

- Phone: 707-476-4153
- Email: the-grove@redwoods.edu

Learning Resource Center

The Learning Resource Center includes the following resources for students:

Library Services

[Introduction - Library Services for Students - LibGuides at College of the Redwoods](#) promotes information literacy and provides organized information resources.

Multicultural and Equity Center (MCE)

The [Multicultural and Equity Center](#) is a dynamic and inclusive place that supports all students in their academic and personal journeys at the college. We do this by creating community, home away from home, and a safe place for cultural expression, cross-cultural learning, access to college and dignity resources, and social justice work opportunities. The MEC is committed to retention and student success by offering activities related to leadership development, student connectedness and student equity. We are a student-centered program that fosters respect for all people.

Academic Support Center

The [Academic Support Center](#) offers tutoring and test proctoring for CR students.

Student Tech Help

Technical [Support](#) provides students with assistance around a variety of tech problems.

Extended Opportunity Programs and Services (EOPS)

[EOPS/CARE](#) (EOPS) provides services to eligible income disadvantaged students including: textbook awards, grants, career academic and personal counseling, transportation assistance, tutoring, laptop, calculator and textbook loans, priority registration, graduation cap and gown, workshops, and more!

TRiO Student Success Program

The TRiO Student Support Services Program provides eligible students with a variety of services including academic advising, career assessments, assistance with transfer, and peer mentoring. Students can apply for the program with the [Eureka TRiO office](#) or the [Del Norte TRiO office](#).

Veterans Resource Center

The [Veterans 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.

CalWORKS

California Work Opportunity & Responsibility to Kids ([CalWorks](#)) provides supportive services to student parents with children under the age of 18, who are receiving cash assistance (TANF benefits), to become self-sufficient. Services include: transportation assistance, basic student supplies, tutoring, priority registration, laptop and calculator loans, career, academic, and personal counseling, and more!

Evaluation & Grading Policy

Course Evaluation

Course Points

All Labs will contribute 50% towards your final grade. Labs are graded at 20 points per lab. 10 Points towards participation and 10 points towards Repair Orders. Please fill out your repair orders as neat and complete as possible. Some labs will be worth more points if they are a multi-day lab.

Tests and Homework will contribute towards the other 50% with 10% towards Homework and 40% toward Tests. Homework will usually be completed as a group after the lecture, however due to certain time constraints it may have to be completed after class.

Your final grade will be based on your grade in Canvas however I will also take into consideration attendance and attitude in the shop when considering your final posted grade. If you ever have any questions about this, feel free to contact me.

Extra Credit - Each student may elect independently to read and report on a topic related to automatic transmissions/transaxles from a source other than the course text i.e. recognized trade publications, library reference material, magazines, newspaper articles, etc... The report must be no less than one page typed and no longer than three pages typed. You must properly cite your references on a separate page. You may earn up to 50 points per report and you may turn in a maximum of 1 report per semester. Please inform the instructor of your topic prior to doing this assignment.

Spring 2025 Dates

Date	To Remember
January 17	Last day to register for classes (day before the first class meeting)
January 18	Classes begin
January 20	Martin Luther King's Birthday (All Campuses Closed)

Date	To Remember
January 24	Last Day to add a class
January 31	Last Day to Drop & Receive a Refund
February 2	Last Day to Drop w/out a "W"
February 3	Census Date (20% of class)
February 14	Lincoln's Birthday (All Campuses Closed)
February 17	President's Day (All Campuses Closed)
March 6	Last Day to Petition to Graduate & Petition for Certificate
March 17 - 22	Spring Break (No Classes)
March 28	Last Day for Student/Faculty Withdrawal
March 31	Cesar Chavez Day (All Campuses Closed)
May 10 - 16	Final Examinations
May 16	Last Day to File P/NP Option
May 16	Semester Ends
May 23	Grades Due
May 26	Memorial Day (All Campuses Closed)
May 30	Grades Available for Transcript Release

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 [2024-2025 College Catalog](#) and [CR Board and Administrative Policies](#).

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. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the [2024-2025 College Catalog](#) and [CR Board and Administrative Policies](#).

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.

Canvas Information

- Log into Canvas at [My CR Portal](#)
- For help logging in to Canvas and general tech help, visit [Canvas Support Home](#)
- Once you're logged in to Canvas, you click on the Help icon on the left menu
- Canvas online orientation workshop: [Canvas Student Orientation Course](#)

Setting Your Preferred Name and Pronouns in Canvas

Students have the ability to display personal pronouns and an alternate first name in Canvas. Students may change their pronouns on their own in Canvas (Account :: Settings :: Edit Settings). To request a change to your preferred list name, contact [Admissions and Records](#). 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-2022.pdf](#).

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](#) and selecting 'Students' then 'Academic Profile' then 'Current Information Update.'

Please contact Public Safety at 707-476-4112 or campus-safety@redwoods.edu if you have any questions. For more information visit [Campus Safety](#). Please review the [EurekaEmergencyMap_S24.pdf](#) for campus evacuation sites, including the closet site to this classroom (posted by the exit of each room).

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.

To learn more about campus-specific Emergency Procedures, click on a title bar below, or click the down arrow to expand them all.

Course Schedule

<i>Day</i>	<i>Theory</i>	<i>Lab</i>	<i>Assigned Reading</i>
1-20	No Class	Holiday	
1-22	Course Overview	Engine Identification	Ch. 1 & 2
1-27	Electrical Review	DMM Usage	
1-29	Engine Operation	Engine Visual Inspect	Ch. 3
2-3	Engine Condition	Engine Testing	Ch. 13
2-5	Pico Scope	Pico Scope Testing	Pico Training Online
2-10	Gasoline	Fuel Inspections	Ch. 5, Ch. 26
2-12	Fuel Systems	Fuel Testing	Ch. 30
2-17	No Class	Holiday	
2-19	Fuel Injection	Scope Injectors	Ch. 27
2-24	GDI Systems	GDI Testing	Ch. 28
2-26	TEST 1	Engine Theory & Fuel	
3-3	Ignition Systems	Ignition Testing	Ch. 16
3-5	Ignition Systems	Pico Scope Testing	Ch. 17
3-10	CKP and CMP	Sensor Testing	
3-12	TEST 2	Ignition Systems	
3-17	No Class	Spring Break	
3-19	No Class	Spring Break	
3-24	Scan Tools	OBD 2	Ch. 19
3-26	Scan Tools	Diagnostic Process	Ch. 33
3-31	No Class	Holiday	
4-2	ETC and TPS	Sensor Diagnosis	Ch. 29 & 21
4-7	MAP & MAF	Sensor Diagnosis	Ch. 22 & 23
4-9	Temperature Sensors	Sensor Diagnosis	Ch. 20

4-14	HO2S & AFS	Sensor Diagnosis	Ch. 24 & 25
4-16	VVT Systems	VVT Diagnosis	Ch. 11
4-21	TEST 3	Engine Sensors	
4-23	Emission Control	PCV, EGR & EVAP	Ch. 32
4-28	Emissions	5 Gas & Converters	Ch. 31
4-30	Networks	Network Diagnosis	Ch. 18
5-5	Diesel Basics	Open Lab	Ch. 4
5-7	Forced Induction	Make Up Lab	Ch. 12
5-12	FINAL EXAM	8:30 to 10:30	