

# AT R126: AUTOMOTIVE ENGINE REPAIR

**Originator**

kevin\_corse1

**College**

Oxnard College

**Discipline (CB01A)**

AT - Automotive Technology

**Course Number (CB01B)**

R126

**Course Title (CB02)**

Automotive Engine Repair

**Banner/Short Title**

Automotive Engine Repair

**Credit Type**

Credit

**Start Term**

Fall 2021

**Formerly**

AT R026 - Automotive Engine Overhaul

AT R026L - Automotive Engine Overhaul Lab

**Catalog Course Description**

This course provides technical preparation in the basic skills required to diagnose, adjust, repair, and overhaul the automotive internal combustion engine. All phases of machine work will be covered. Quality inspection and reassembly procedures will be stressed. Preparation for the ASE certification is included.

**Taxonomy of Programs (TOP) Code (CB03)**

0948.00 - \*Automotive Technology

**Course Credit Status (CB04)**

D (Credit - Degree Applicable)

**Course Transfer Status (CB05) (select one only)**

B (Transferable to CSU only)

**Course Basic Skills Status (CB08)**

N - The Course is Not a Basic Skills Course

**SAM Priority Code (CB09)**

C - Clearly Occupational

**Course Cooperative Work Experience Education Status (CB10)**

N - Is Not Part of a Cooperative Work Experience Education Program

**Course Classification Status (CB11)**

Y - Credit Course

**Educational Assistance Class Instruction (Approved Special Class) (CB13)**

N - The Course is Not an Approved Special Class

**Course Prior to Transfer Level (CB21)**

Y - Not Applicable

**Course Noncredit Category (CB22)**

Y - Credit Course

**Funding Agency Category (CB23)**

Y - Not Applicable (Funding Not Used)

**Course Program Status (CB24)**

1 - Program Applicable

**General Education Status (CB25)**

Y - Not Applicable

**Support Course Status (CB26)**

N - Course is not a support course

**Field trips**

May be required

**Grading method**

Letter Graded

**Alternate grading methods**

Credit by exam, license, etc.

**Does this course require an instructional materials fee?**

No

**Repeatable for Credit**

No

**Is this course part of a family?**

No

**Units and Hours**

**Carnegie Unit Override**

No

**In-Class**

**Lecture**

**Minimum Contact/In-Class Lecture Hours**

87.5

**Maximum Contact/In-Class Lecture Hours**

87.5

**Activity**

**Laboratory**

**Minimum Contact/In-Class Laboratory Hours**

52.5

**Maximum Contact/In-Class Laboratory Hours**

52.5

**Total in-Class****Total in-Class****Total Minimum Contact/In-Class Hours**

140

**Total Maximum Contact/In-Class Hours**

140

**Outside-of-Class****Internship/Cooperative Work Experience**

Paid

Unpaid

**Total Outside-of-Class****Total Outside-of-Class****Minimum Outside-of-Class Hours**

175

**Maximum Outside-of-Class Hours**

175

**Total Student Learning****Total Student Learning****Total Minimum Student Learning Hours**

315

**Total Maximum Student Learning Hours**

315

**Minimum Units (CB07)**

6

**Maximum Units (CB06)**

6

**Advisories on Recommended Preparation**

AT R110

**Student Learning Outcomes (CSLOs)****Upon satisfactory completion of the course, students will be able to:**

- |   |  |
|---|--|
| 1 | Students will be able to identify and act on environmental safety rules and regulations, in the following areas. Shop safety, personal safety, hazardous material safety, air bag safety, power tools, and typical equipment safety. |
| 2 | Students will be able to demonstrate their ability to identify, retrieve, analyze and apply basic automotive technical information including but not limited to online information.  |
| 3 | Students will be able to read industry standard measuring tools, such as a micrometer and dial caliper, to determine acceptable tolerances for common automotive components  |

**Course Objectives****Upon satisfactory completion of the course, students will be able to:**

- |   |  |
|---|--|
| 1 | Identify safety hazards in the automotive shop.            |
| 2 | Describe and demonstrate proper customer relations.        |
| 3 | Explain the operation of the internal combustion engine    |
| 4 | Explain cylinder arrangement, designs, and classifications |
| 5 | Explain the lubrication and cooling systems                |

- |    |   |
|----|---|
| 6  | Use and identify engine hardware fasteners, thread repair kits, and gaskets |
| 7  | Identify and measure valve train components                                 |
| 8  | Locate cylinder head or engine block cracks                                 |
| 9  | Use and calibrate engine measurement equipment                              |
| 10 | Measure and identify engine rings, pistons, rods, and crankshafts           |
| 11 | Identify causes of engine failure   |

## Course Content

### Lecture/Course Content

1. Shop Safety and Practices
  - a. Safety review and test
  - b. Shop safety with tools
  - c. Uniforms and foot wear
  - d. Safe handling of fuel and hazardous materials
2. Engine Operation
  - a. Principles of a four stroke engine
  - b. Identification of engine
  - c. Reference material
  - d. Specifications
3. The Overhaul
  - a. Discussing repair needs with a customer
  - b. Diagnosing repair needs
  - c. Estimating repairs and cautions
4. Removal and Disassembly of Valve Head
  - a. Determining wear
  - b. Replacing guides
  - c. Reaming guides
  - d. Inspection of valve springs
  - e. Inspection of valve keepers and rotators
  - f. Inspection of valve seats
5. Removal of Camshaft
  - a. Measurements of camshaft
  - b. Testing lifters
6. Removal and Disassembly of Engine Block
  - a. Locating cracks
  - b. Repairing cracks
  - c. Repairing damaged threads
  - d. Determining correct gaskets and sealants
  - e. Precision measuring instruments
  - f. Cleaning parts
7. Ordering Engine Parts
  - a. Rebuilding cores
  - b. Used parts or new parts
  - c. Estimating and pricing
8. Basic Block Reconditioning
  - a. Plugs, boring, honing
  - b. Repair metal bur
9. Crankshafts and Rods
  - a. Inspection and replacement
  - b. Polishing and service
  - c. Inspection and alignment
  - d. Oil pump and filtration
  - e. Engine bearings, removal and replacement
10. Pistons and Rings

- a. Piston failures and proper replacement selection
- b. Piston ring identification
- c. Piston ring installation
- 11. Finishing the Overhaul
  - a. Valve adjustment
  - b. Timing adjustment
  - c. Proper startup procedures for rebuilt engines
  - d. Customer relations after the job is complete
- 12. Customer Relations
  - a. ASE certification and Customer Service
  - b. Automotive Technician Customer Service Do's and Dont's
  - c. Customer Follow-Up Service

### Laboratory or Activity Content

1. Shop Safety and Practices
  - a. Safety review and test
  - b. Shop safety with tools
  - c. Uniforms and foot wear
  - d. Safe handling of fuel and hazardous materials
2. Engine Operation
  - a. Principles of a four stroke engine
  - b. Identification of engine
  - c. Reference material
  - d. Specifications
3. The Overhaul
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  - b. Timing adjustment
  - c. Proper startup procedures for rebuilt engines
  - d. Customer relations after the job is complete

## Methods of Evaluation

**Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):**

Problem solving exercises  
Skills demonstrations  
Written expression

**Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):**

Group projects  
Laboratory activities  
Laboratory reports  
Objective exams  
Oral presentations  
Problem-solving exams  
Portfolios  
Quizzes  
Skill tests

## Instructional Methodology

**Specify the methods of instruction that may be employed in this course**

Audio-visual presentations  
Class activities  
Class discussions  
Case studies  
Distance Education  
Demonstrations  
Field trips  
Internet research  
Lecture

**Describe specific examples of the methods the instructor will use:**

1. Reading assignments about engine overhaul procedures.
2. Student to teacher role-playing pertaining to customer service relations.
3. Use of automotive computer information systems to perform research of automotive engine repairs for various automotive manufacturers.
4. Display and demo of diagnostic equipment and measurement devices.
5. Display of good and bad engine parts for comparison.

## Representative Course Assignments

### Writing Assignments

1. Students will be required to answer questions at the end of each chapter; some questions require students to respond in essay format.
2. Students will be required to write notes on diagnostic steps and conclusions made from specific testing procedures.
3. In order to keep up to date with current trends and technologies in the auto industry as it relates to engines, students will write summaries of content researched from professional journals and internet sites.

**Reading Assignments**

1. Students will be required to do outside reading in professional journals such as Motor Age Magazine and Motor Service Journal in addition to the textbook assignments, students will be required to write summaries of assigned reading topics and be prepared to engage in class discussions regarding the assigned topics.
2. Students will be required to do outside reading at assigned internet sites such as the State of California Bureau of Automotive Repair and Department of Consumer Affairs and be prepared to share updates on rules and regulations if called upon.
3. Students will be required to do outside reading about specific engines and modifications offered by the aftermarket and be prepared to dialogue on aftermarket modifications to a potential customer during role-playing exercises.

**Skills Demonstrations**

1. Students will be evaluated and graded on the performance of their hands-on proficiency during lab activities as it relates to the diagnosis, repair, and maintenance of the automotive engine.

**Outside Assignments****Representative Outside Assignments**

Students will complete multiple online certificates at the training site for Gates Belts.

Each certificate is for a different sub system for the automotive engine and requires watching videos and taking exams.

**District General Education**

**A. Natural Sciences**

**B. Social and Behavioral Sciences**

**C. Humanities**

**D. Language and Rationality**

**E. Health and Physical Education/Kinesiology**

**F. Ethnic Studies/Gender Studies**

**CSU GE-Breadth**

**Area A: English Language Communication and Critical Thinking**

**Area B: Scientific Inquiry and Quantitative Reasoning**

**Area C: Arts and Humanities**

**Area D: Social Sciences**

**Area E: Lifelong Learning and Self-Development**

**CSU Graduation Requirement in U.S. History, Constitution and American Ideals:**

**IGETC**

**Area 1: English Communication**

**Area 2A: Mathematical Concepts & Quantitative Reasoning**

**Area 3: Arts and Humanities**

**Area 4: Social and Behavioral Sciences**

**Area 5: Physical and Biological Sciences**

**Area 6: Languages Other than English (LOTE)**

**Textbooks and Lab Manuals**

**Resource Type**

Textbook

**Classic Textbook**

No

**Description**

Halderman, J.D (2018). Automotive Engines (9th/e). Prentice Hall.

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**Resource Type**

Other Instructional Materials

**Description**

Automotive films, tapes, and worksheets (teacher provided)

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## Library Resources

Sufficient Library Resources exist

Yes

## Distance Education Addendum

### Definitions

#### Distance Education Modalities

Hybrid (51%–99% online)

Hybrid (1%–50% online)

### Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

### Regular Effective/Substantive Contact

Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Regular use of asynchronous discussion boards encourages various types of interaction and critical thinking skills among all course participants. Questions and topics posed will allow students to discuss, compare and contrast, identify, and analyze elements of the course outcomes. Other discussion boards may be used for Q&A and general class discussion by students and instructor to facilitate student success and strengthen student learning outcomes.
E-mail	E-mail, class announcements and various learning management system tools such as “Message Students Who” and “Assignment Comments”, will be used to regularly communicate with all students on matters such as clarification of class content, reminders of upcoming assignments and/or course responsibilities, to provide prompt feedback to students on coursework to facilitate student learning outcomes, or to increase the role of an individual educator in the academic lives of a student. Students will be given multiple ways to email instructor through both the learning management system inbox and faculty provided email accounts.
Face to Face (by student request; cannot be required)	Students will have direct face-to-face contact with instructor during weekly class meetings. This time will provide the opportunity for students to discuss and ask questions about the material to facilitate student learning objectives and course outcomes. The instructor will also hold weekly, scheduled office hours for students to be able to meet and discuss course materials or individual progress. Students can request additional in-person or web conferencing meetings with faculty member as needed. Faculty may encourage online students to form “study groups” in person or online. Note: For hybrid classes, face-to-face class time will provide opportunities for students to discuss amongst themselves (in groups or pairs) and ask questions about the material to facilitate SLOs and course outcomes.

Other DE (e.g., recorded lectures)	Faculty may use a variety of ADA compliant tools and media integrated within the learning management system to help students reach SLO competency. Tools may include: o Recorded Lectures, Narrated Slides, Screencasts o Instructor created content o OC Online Library Resources o Canvas Peer Review Tool o Canvas Student Groups (Assignments, Discussions) o 3rd Party (Publisher) Tools (MyOpenMath) o Websites and Blogs o Multimedia (YouTube, Films on Demand, 3CMedia, Khan Academy, etc.)
Synchronous Dialog (e.g., online chat)	Instructor may provide a set time each week where they will be available for synchronous chat and be available in the discussion board and can answer questions in live time.
Video Conferencing	Video tools such as ConferZoom can be used to provide live synchronous or asynchronous sessions with students. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Video Conferences will be used to facilitate SLOs and student-to-student group meetings will also be encouraged.
<b>Hybrid (51%–99% online) Modality:</b>	
<b>Method of Instruction</b>	<b>Document typical activities or assignments for each method of instruction</b>
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**Examinations****Hybrid (1%–50% online) Modality**

Online  
On campus

**Hybrid (51%–99% online) Modality**

Online  
On campus

**Primary Minimum Qualification**

AUTOMOTIVE TECHNOLOGY

**Review and Approval Dates****Department Chair**

12/02/2020

**Dean**

12/02/2020

**Technical Review**

12/09/2020

**Curriculum Committee**

12/09/2020

**CCCCO**

MM/DD/YYYY

**Control Number**

CCC000611784

**DOE/accreditation approval date**

MM/DD/YYYY