

AT R120: AUTOMOTIVE TRANSMISSION AND DRIVE LINE

Originator

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College

Oxnard College

Discipline (CB01A)

AT - Automotive Technology

Course Number (CB01B)

R120

Course Title (CB02)

Automotive Transmission and Drive Line

Banner/Short Title

Automotive Transmission

Credit Type

Credit

Start Term

Fall 2021

Formerly

AT R030 - Automotive Transmission and Drive Line
AT R030L - Automotive Transmission and Drive Line Lab

Catalog Course Description

This course provides technical preparation in the basic skills required to diagnose, adjust, repair, and overhaul the automotive transmission and drive line. All phases of transmission diagnosis and repair 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

Does this course require an instructional materials fee?

No

Repeatable for Credit

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 | Identify and demonstrate 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 | Demonstrate their ability to identify, retrieve, comprehend and apply basic automotive technical information including but not limited to online information. |
| 3 | Read industry standard measuring tools, such as a micrometer and dial caliper, to determine acceptable tolerances for common automotive components. |
| 4 | Demonstrate how to test electrical circuits in a transmission including speed sensors, solenoids, relays, switches, and related wiring. |
| 5 | Demonstrate how to find manufacturer specific technical service bulletins and overhaul procedures for a specific transmission. |
| 6 | Demonstrate testing a transmission for line pressure and find pressure specifications in automotive information programs such as Alldata and Mitchell. |

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 automatic transmission |
| 4 | Explain torque converter operation |
| 5 | Explain the lubrication and cooling systems related to transmissions |
| 6 | Use and identify automotive hardware fasteners, thread repair kits, and gaskets |
| 7 | Identify and measure valve body components |

- 8 Use a digital volt/ohm meter to check electrical circuits in transmissions
- 9 Use transmission pressure gauges and identify causes of abnormal readings
- 10 Measure and identify internal transmission components
- 11 Identify causes of transmission failure
- 12 Find technical service bulletins on the internet related to transmission problems
- 13 Reprogram vehicle transmission control computers

Course Content

Lecture/Course Content

1. Shop Safety and Practices
 1. Safety review and test
 2. Shop safety with tools
 3. Uniforms and footwear
 4. Safe handling of transmission oils and hazardous materials
2. Automatic Transmission Operation
 1. Principles of automatic transmission operation
 2. Identification of automatic transmission
 3. Reference material
 4. Specifications
3. The Overhaul
 1. Discussing repair needs with a customer
 2. Diagnosing repair needs
 3. Estimating repairs and cautions
4. Removal and Disassembly of Valve Body
 1. Determining wear
 2. Testing solenoids, relays and switches
 3. Testing of gear speed sensors
 4. Inspection of valve springs and check systems
 5. Inspection of valve passages for damage
 6. Inspection of filters
5. Removal of Torque Converters
 1. Principles of torque converter operation
 2. Testing torque converters
6. Removal and Disassembly of Transmission
 1. Locating cracks
 2. Repairing cracks
 3. Repairing damaged threads
 4. Determining correct gaskets and sealants
 5. Precision measuring instruments
 6. Cleaning parts
7. Ordering Transmission Parts
 1. Rebuilding cores
 2. Used parts or new parts
 3. Estimating and pricing
8. Basic Understanding of Transmission Fluids
 1. The correct fluid that is specified for a specific transmission
 2. Causes of transmission fluid failure
9. Finishing the Overhaul
 1. Valve body service and adjustment
 2. Proving the electrical components
 3. Proper startup procedures for rebuilt transmissions
 4. Customer relations after the job is complete
10. Customer Service
 1. Communicating with the customer
 2. Automotive Technician Customer Service Etiquette

Laboratory or Activity Content

Task sheets and ASE approved Labs for the disassembly and reassembly of Automatic Transmissions and manual Transmissions.

1. Shop Safety and Practices
 1. Safety review and test

2. Shop safety with tools
3. Uniforms and footwear
4. Safe handling of fuel and hazardous materials
2. Automotive Transmission Operation
 1. Principles of automotive transmission operation
 2. Identification of automotive transmission
 3. Reference material
 4. Specifications
3. The Overhaul
 1. Discussing repair needs with a customer
 2. Diagnosing repair needs
 3. Estimating repairs and cautions
4. Removal and Disassembly of Valve Body
 1. Determining wear
 2. Testing solenoids, relays and switches
 3. Testing the gear speed sensors
 4. Inspection of valve springs and check systems
 5. Inspection of valve passages for damage
 6. Inspection of filters
5. Removal and Disassembly of Transmission
 1. Locating cracks
 2. Repairing cracks
 3. Repairing damaged threads
 4. Determining correct gaskets and sealants
 5. Precision measuring instruments
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6. Ordering Transmission Parts
 1. Rebuilding cores
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7. Basic Understanding of Transmission Fluids
 1. The correct fluid that is specified for a specific transmission
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8. Finishing the Overhaul
 1. Valve body service and adjustment
 2. Proving the electrical components
 3. Proper startup procedures for rebuilt transmissions
 4. 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):

Essay exams
 Individual projects
 Laboratory activities
 Objective exams
 Oral presentations
 Quizzes
 Skills demonstrations
 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

Instructor-guided interpretation and analysis

Lecture

Describe specific examples of the methods the instructor will use:

Instructor will use all methods of instruction. Textbook and classroom lessons will be supported by lab activities.

Representative Course Assignments

Writing Assignments

1. Students will be required to answer questions at the end of each chapter, some questions will require essay responses as will certain test questions. An example of an essay question may ask the student to describe how the power flows through the transmission in drive gear compared to reverse gear.
2. Students will be required to write notes on diagnostic steps and conclusions made from specific testing procedures. If a vehicle has a computer transmission fault code, what is the step by step procedure for diagnosis?
3. Students will write reports on transmission repair and service needs, after doing a "disassembly" in the lab class.

Critical Thinking Assignments

1. Trace power flow in the hydraulic system through the valve body to determine actuator efficacy using flow charts.
2. Determine test points for high and low pressure transmission main body.

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 and write summaries on assigned reading 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 discuss updates to rules and regulations in class.
3. Students will be required to do outside reading about specific automatic transmissions and modifications offered by the aftermarket and be prepared to discuss these modifications to a customer during customer service role-playing exercises.

Skills Demonstrations

1. Students will disassemble the automatic transmission measure important components.
2. Reassemble transmission and determine proper operations.
3. Properly torque all valve body components

Other assignments (if applicable)

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Outside Assignments

Representative Outside Assignments

1. Read assigned chapters and complete quizzes.
2. Review multiple videos on transmission shifting failures.
3. Complete online safety course.
4. Research periodicals on specific transmission related topics.

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

DescriptionHalderman, James (2018). *Automatic Transmissions and Transaxles* (7th). Prentice Hall. 9780134654**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
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.
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.

Hybrid (51%–99% 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.
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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

CCC000611492

DOE/accreditation approval date

MM/DD/YYYY