AUTO 016: AUTOMOTIVE MANUAL TRANSMISSIONS & DRIVE TRAIN SYSTEMS

Originator

dredman

Co-Contributor(s)

Name(s)
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Justification / Rationale

The Automotive Faculty are reviewing and/or updating this course to assure compliance with local, State, and Federal regulations; support consistency within the curriculum; practice relevance regarding automotive industry and community; and to make improvements that will strengthen the learning environment this course creates thus benefiting the learners.

Effective Term

Fall 2022

Credit Status

Credit - Degree Applicable

Subject

AUTO - Automotive Technology

Course Number

016

Full Course Title

Automotive Manual Transmissions & Drive Train Systems

Short Title

AUTO MANUAL TRANS

Discipline

Disciplines List
Automotive Technology

Modality

Face-to-Face
Hybrid

Catalog Description

This course provides theory and hands-on experience in manual transmissions/transaxles including: theory of operation, service, diagnosis and repair. The course includes the following topics: clutches, axles, driveshafts, transfer cases, differentials, electrical controls, diagnosis, troubleshooting and partial disassembly and reassembly. A $20.00 test fee for the appropriate Automotive Service Excellent (ASE) Student Exam is required. A uniform is required for this course.

Schedule Description

This class provides lecture/discussion and hands-on experience understanding, servicing, troubleshooting, diagnosing and repairing manual transmissions/transaxles. A $20.00 test fee for the appropriate Automotive Service Excellent (ASE) Student Exam is required. A uniform is required for this course.
Prerequisite: AUTO 010 or concurrent enrollment.

Lecture Units

2

Lecture Semester Hours

36

Lab Units
1
Lab Semester Hours
54

In-class Hours
90

Out-of-class Hours
72

Total Course Units
3
Total Semester Hours
162

Prerequisite Course(s)
AUTO 010 or concurrent enrollment

Required Text and Other Instructional Materials

Resource Type
Book
Open Educational Resource
No

Author
Various

Title
ASE Automotive Suite (Text, shop manual, and workbook for all 8 ASE automotive categories)

Edition
7th

City
Tinley Park, Illinois

Publisher
Goodheart Wilcox

Year
2021

College Level
Yes

Flesch-Kincaid Level
11.3

ISBN #
978-1-64564-559-7

Class Size Maximum
21

Entrance Skills
Describe shop safety practices.

Requisite Course Objectives
AUTO 010-Describe shop safety practices and proper procedures regarding handling hazardous material.

Entrance Skills
Identify basic automotive tools and equipment.

Requisite Course Objectives
AUTO 010-Identify basic automotive tools and equipment.

Entrance Skills
Locate applicable vehicle service specifications and procedures using the latest online service information.

Requisite Course Objectives
AUTO 010-Locate applicable vehicle service specifications and procedures using the latest online service information.

Entrance Skills
Properly complete a repair order including all pertinent information and compliant, cause and correction

Requisite Course Objectives
AUTO 010-Properly position and lift a vehicle using a floor jack and jack stands and a vehicle hoist.

Entrance Skills
Locate and interpret key vehicle identification information.

Requisite Course Objectives
AUTO 010-Locate and interpret key vehicle identification information.

Course Content

1. Orientation, safety & environmental protection.
2. Automotive repair industry terms and conventions.
3. Drive train theory of operation.
4. Clutches.
5. Manual transmissions/transaxles.
6. Front and rear drive shafts and axles.
7. Differentials.
8. Four-wheel drive systems.
9. Diagnosis, troubleshooting and repair.
10. 4WD/AWD control systems.
11. Automotive industry web-based training modules.

Lab Content

1. Safety & environmental protection.
2. Identify drive train components on a vehicle.
3. Diagnose, service and repair clutch concerns, manual transmission/transaxle concerns, front and rear drive shaft and axle concerns, differential concerns, four-wheel drive system concerns.
4. Required tasks to meet the Automotive Service Excellence (ASE) 2017 Master Automotive Service Technician (MAST) standards.

Course Objectives

	Objectives
Objective 1	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
Objective 2	Explain the importance of and perform a general drive train evaluation and diagnosis.
Objective 3	Explain the importance of and perform a clutch diagnosis and repair.

Objective 4	Explain the importance of and perform a transmission/transaxle diagnosis and repair.
Objective 5	Explain the importance of and perform a drive-shaft and half-shaft, universal and constant-velocity (CV) joint diagnosis and repair.
Objective 6	Explain the importance of and perform a drive axle diagnosis and repair related to ring and pinion gears and differential case assembly
Objective 7	Explain the importance of and perform a limited slip differential diagnosis and repair.
Objective 8	Explain the importance of and perform a drive axle diagnosis and repair.
Objective 9	Explain the importance of and perform a four-wheel drive/all-wheel drive diagnosis and repair.
Objective 10	Explain the importance of and list tools, equipment, shop and personal safety equipment.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Apply research skills to an intermediate to advanced level manual drive train system malfunction, given industry standard service manuals, service bulletins, repair bulletin boards, automotive textbooks, and appropriate internet information.
Outcome 2	Practice proper inspection, repair, and maintenance skills given a manual drive train concern, using the proper diagnostic and repair tools, in a team setting.
Outcome 3	Discover the root cause of an intermediate to advanced level manual drive train concern.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Discussion	Participate in classroom discussions.
Technology-based instruction	Diagnostic equipment based activities.
Demonstration, Repetition/Practice	Demonstrate their ability to correctly perform a given task, not limited to laboratory assignments, research projects, interactive role-play and group activities.
Collaborative/Team	Work in a team setting while performing lab activities.
Participation	Participate in, but not limited to, classroom activities, research activities, role-play, interactive testing.
Observation	Perform assigned lab activities.
Lecture	Each class is half lecture covering multiple aspects of course content.
Laboratory	Required tasks to meet the Automotive Service Excellence (ASE) 2017 Master Automotive Service Technician (MAST) standards.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
College level or pre-collegiate essays	A research report submitted or completed, not limited to a, written, presentation, however the learner is required to research information pertaining to the assignment (both in and out of class).	Out of Class Only
Reading reports	Turned in by report, written, presentation, however, the learner is required to research information pertaining to the assignment (both in and out of class).	In and Out of Class
Student participation/contribution	Lab activities where the learner may participate in role play activities, or presentation.	In Class Only
Mid-term and final evaluations	Review of homework. Lab activity evaluations. Written and hands-on exams (both in and out of class).	In and Out of Class
Group activity participation/observation	Participate in role play activities (both in and out of class).	In and Out of Class

Presentations/student demonstration observations	Participate in role play activities and be required to do a visual presentation (both in and out of class).	In and Out of Class
Laboratory projects	Participate in lab based activities to complete the Automotive Service Excellence (ASE) 2017 Master Automotive Service Technician (MAST) standards.	In Class Only
Written homework	Readings from required text: 1-3 chapters per week from both classroom and shop manuals. Homework from required text: multiple-choice questions, fill in the blank and essay questions to be graded each week (both in and out of class).	In and Out of Class

Assignments

Other In-class Assignments

Review homework from required text: multiple-choice questions, fill in the blank and essay questions to be graded each week.

1. Begin SP2 safety tests.
2. Notes on lecture.
3. Participation in discussion related to topic of lecture.
4. Review and discuss vehicle diagnosis, troubleshooting and repair of personal, shop and other vehicles to be evaluated by the instructor during lab time.
5. Must develop teamwork skills through classroom interaction and discussion.

Other Out-of-class Assignments

1. Readings from required text: 1-3 chapters per week from both classroom and shop manuals. Each chapter 2 hours per week.
2. Homework from required text: multiple-choice questions, fill in the blank and essay questions to be graded each week. Each chapter 2 hours per week.
3. Completion of 2 SP2 safety tests, each subject including an average of 4 hours
   a. Mechanical Safety
   b. Pollution prevention
4. Assigned readings and written summaries from selected instructor handouts. 1 hour
5. Written summaries and analysis of assigned websites.
6. Must complete a course project consisting of an essay describing, analyzing and summarizing a selected topic, including out of class research and fieldwork. 8 hours
7. Vehicle diagnosis, troubleshooting and repair of personal, shop and other vehicles to be evaluated by the instructor during lab time.
8. Hands-on lab worksheets matching each course objective. These will be graded by the instructor throughout the semester during lab time.
9. Must develop teamwork skills through lab activities and assigned special projects.
10. Automotive industry web-based training modules, each taking roughly 3 hours.
11. Exam prep. 12 hours

Grade Methods

Letter Grade Only

Distance Education Checklist

Include the percentage of online and on-campus instruction you anticipate.

Online %

50

On-campus %

50

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?

Lab component of the course will be completed in a laboratory environment on campus under the supervision of an instructor

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?

The lab content is comprised of the required tasks to meet the Automotive Service Excellence (ASE) 2017 Master Automotive Service Technician (MAST) standards.

How will you assess the online delivery of lab activities?

Laboratory activities will not be delivered in the online setting, only in person.

Instructional Materials and Resources

If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?

SP2 online safety training

If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.

SP2 - free account provided to all student to ensure the student ability to distinguish safety working condition from unsafe practices

Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

Within Course Management System:

Discussion forums with substantive instructor participation
Online quizzes and examinations
Regular virtual office hours
Timely feedback and return of student work as specified in the syllabus
Video or audio feedback
Weekly announcements

External to Course Management System:

Direct e-mail
Synchronous audio/video

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

Regular effective contact will be practiced through online lecture, discussion board postings, email communications, regular announcements, prompt grading and feedback of assignments, and virtual office hours. This contact between the facilitator and learner on a regular basis will enhance learner confidence and understanding and promote critical thinking and analyzation of subject matter.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.

Interaction between instructor and student will help to enhance learning and understanding of subject material and engage the student to increase learning.

Other Information

Provide any other relevant information that will help the Curriculum Committee assess the viability of offering this course in an online or hybrid modality.

With uncertainty of the teaching environment, enabling the lecture portion of this course to be delivered in an online setting, while keeping the hands on portion face-to-face will ensure students can access needed training to ensure knowledge and experience is achieved to gain employment in the automotive field

MIS Course Data

CIP Code

47.0604 - Automobile/Automotive Mechanics Technology/Technician.

TOP Code

094800 - Automotive Technology

SAM Code

C - Clearly Occupational

Basic Skills Status
Not Basic Skills

Prior College Level
Not applicable

Cooperative Work Experience
Not a Coop Course

Course Classification Status
Credit Course

Approved Special Class
Not special class

Noncredit Category
Not Applicable, Credit Course

Funding Agency Category
Not Applicable

Program Status
Program Applicable

Transfer Status
Transferable to CSU only

General Education Status
Y = Not applicable

Support Course Status
N = Course is not a support course

Allow Audit
Yes

Repeatability
No

Materials Fee
No

Additional Fees?
Yes

Additional Fee Amount
$20.00

Additional Fees Description
Automotive Service Excellent (ASE) Student Exam.

Approvals

Curriculum Committee Approval Date
3/17/2022

Academic Senate Approval Date
3/24/2022

Board of Trustees Approval Date
4/22/2022

Chancellor's Office Approval Date
5/07/2022

Course Control Number
CCC000631446

Programs referencing this course
Automotive Air Conditioning Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=104)
Automotive Transmission Axle Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=108)
Automotive Braking Systems Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=109)
Automotive Light and Medium Duty Diesel Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=111)
Automotive Steering, Suspension, Alignment Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=112)
Automotive Introductions Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=201)
Advanced Transportation Technologies AS Degree (http://catalog.collegeofthedesert.eduundefined/?key=44)
Advanced Transportation Technologies AS Degree (http://catalog.collegeofthedesert.eduundefined/?key=45)
Automotive Technology AS Degree (http://catalog.collegeofthedesert.eduundefined/?key=57)