

# AUTO 012A: AUTOMOTIVE SUSPENSION & STEERING SYSTEMS

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**Originator**

dredman

**Co-Contributor(s)****Name(s)**

Anderson, Dorothy

**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 in regard to 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**

012A

**Full Course Title**

Automotive Suspension &amp; Steering Systems

**Short Title**

AUTO SUSP &amp; STEERING

**Discipline****Disciplines List**

Automotive Technology

**Modality**

Face-to-Face

Hybrid

**Catalog Description**

This course provides theory and hands-on experience in automotive steering and suspension systems including: theory of operation, service, diagnosis and repair. The course includes the following topics: front and rear suspension types, steering systems, four-wheel alignment, shocks, struts, tires and wheels. 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 automotive steering and suspension systems. 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**

3

**Lecture Semester Hours**

54

**Lab Units**

1

**Lab Semester Hours**

54

**In-class Hours**

108

**Out-of-class Hours**

108

**Total Course Units**

4

**Total Semester Hours**

216

**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**

11.4

**ISBN #**

978-1-64564-559-7

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**Class Size Maximum**

24

**Entrance Skills**

Describe shop safety practices and proper procedures regarding handling hazardous material.

**Requisite Course Objectives**

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

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**Entrance Skills**

Identify basic automotive tools and equipment.

**Requisite Course Objectives**

AUTO 010-Identify basic automotive tools and equipment.

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**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.

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**Entrance Skills**

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

**Requisite Course Objectives**

AUTO 010-Properly complete a repair order including all pertinent information and compliant, cause and correction.

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**Entrance Skills**

Properly position and lift a vehicle using a floor jack and jack stands and a vehicle hoist.

**Requisite Course Objectives**

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

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**Entrance Skills**

Test drive a vehicle to verify the concern and the repair.

**Requisite Course Objectives**

AUTO 010-Test drive a vehicle to verify the concern and the repair.

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**Entrance Skills**

Work together in a team setting.

**Requisite Course Objectives**

AUTO 010-Display team work.

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**Course Content**

1. SP2 safety & environmental concerns.
2. Hand tools, special service tools & shop equipment.
3. Theory of operation & design.
4. Automotive repair industry terms and conventions.
5. Tires and wheels.
6. Shocks and struts.
7. Front and rear suspension.
8. Steering columns and linkage.
9. Power steering pumps.
10. Four-wheel steering systems.
11. Four-wheel alignment.
12. Frames and frame damage.
13. Supplemental restraint systems.
14. Automotive industry web-based training modules.

**Lab Content**

1. Safety and environmental protection.
2. Diagnosis, service, repair and maintenance of tires and wheels.
3. Diagnosis, service, repair and maintenance of shocks and struts.
4. Diagnosis, service, repair and maintenance of front and rear suspension concerns.
5. Diagnosis, service, repair and maintenance of steering columns and linkage. concerns.
6. Diagnosis, service, repair and maintenance of power steering pumps concerns.
7. Perform four-wheel alignment.
8. Identify frame damage.
9. Meet the Automotive Service Excellence (ASE) 2017 Master Automotive Service Technician (MAST) standards.

**Course Objectives**

	<b>Objectives</b>
Objective 1	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
Objective 2	Suspension and Steering Systems: including Research applicable vehicle and service information, including fluid type, vehicle service history, service precautions, technical service bulletins. Also Identify and interpret suspension and steering system concerns; determine needed action.
Objective 3	Analyze vehicle characteristics steering systems diagnosis and repair
Objective 4	Analyze vehicle characteristics to determine suspension systems diagnosis and repair
Objective 5	List typical suspension and steering maintenance items
Objective 6	Perform a wheel alignment diagnosis, adjustment, and repair
Objective 7	List common wheel and tires diagnosis and repair procedures
Objective 8	Identify suspension and steering tools and equipment
Objective 9	Successfully complete SP2 safety training

**Student Learning Outcomes**

	<b>Upon satisfactory completion of this course, students will be able to:</b>
Outcome 1	Discover the root cause of intermediate to advanced level 4-wheel alignment concerns and suspension and steering system malfunctions.
Outcome 2	Demonstrate proficiency in referencing service information and documenting repairs, while practicing shop safety and teamwork when servicing and repairing suspension and steering concerns.
Outcome 3	Practice proper inspection, diagnostic, repair, and maintenance skills on suspension and steering systems concerns in a team setting.
Outcome 4	Prepare a study guide to be used to successfully complete the Automotive Service Excellence (ASE) Suspension and Steering student exam.

**Methods of Instruction**

<b>Method</b>	<b>Please provide a description or examples of how each instructional method will be used in this course.</b>
Demonstration, Repetition/Practice	Learners will perform assigned lab activities to meet NATEF requirements.
Technology-based instruction	Diagnostic test equipment, computer-based tools, and virtual reality scenarios.
Lecture	Each class is half lecture covering multiple aspects of course content.
Laboratory	Learners will participate in lab based activates to complete their NATEF standards job sheets.
Discussion	Classroom and lab activities require critical thinking and diagnosis.
Collaborative/Team	Learners will work in a team setting while performing NATEF tasks, researching information and group based activities.
Observation	Lab activities and student may participate in role play activities.

**Methods of Evaluation**

<b>Method</b>	<b>Please provide a description or examples of how each evaluation method will be used in this course.</b>	<b>Type of Assignment</b>
College level or pre-collegiate essays	Learners may be required to write a research paper.	Out of Class Only
Student participation/contribution	Learners will participate in classroom activities, research activities, role-play, interactive testing.	In and Out of Class
Tests/Quizzes/Examinations	Used to evaluate learners' knowledge and understanding of the information presented. Examples of these are not limited to quizzes, exams, presentations, research, or projects.	In and Out of Class
Group activity participation/observation	Lab activities and participation in role play activities	In and Out of Class
Presentations/student demonstration observations	Each learner will demonstrate their ability to correctly perform a given task, not limited to laboratory assignments, research projects, interactive role-play, and group activities.	In Class Only
Laboratory projects	Learners will analyze and evaluate course related material then participate in lab based activities to complete their ASE standards job sheets.	In Class Only
Written homework	Synthesize lecture notes and readings from required text to complete homework. Homework: 1-3 chapters per week from both classroom and shop manuals.	Out of Class Only

**Assignments**
**Other In-class Assignments**

1. Review homework from required text: multiple-choice questions, fill in the blank and essay questions to be graded each week.
2. Begin SP2 safety tests.
3. Notes on lecture.
4. Participation in discussion related to topic of lecture.
5. Review and discuss vehicle diagnosis, troubleshooting and repair of personal, shop and other vehicles to be evaluated by the instructor during lab time.
6. 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. Average 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 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 appropriate facilitator.

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

The facilitator will supervise all lab content, guiding the learner in productivity and understanding.

**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 used to ensure the learners ability to distinguish safe working practices and conditions from unsafe practices and conditions.

## 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:**

Chat room/instant messaging  
Discussion forums with substantive instructor participation  
Online quizzes and examinations  
Private messages  
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

**For hybrid courses:**

Field trips  
Orientation, study, and/or review sessions  
Scheduled Face-to-Face group or individual meetings

**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 learner will help to enhance learning and understanding of subject material.

## 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**

5/06/2022

**Course Control Number**

CCC000631391

**Programs referencing this course**Automotive Air Conditioning Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined/?key=104>)Automotive Braking Systems Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined/?key=109>)Automotive General Service Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined/?key=110>)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>)Automotive Technology AS Degree (<http://catalog.collegeofthedesert.eduundefined/?key=57>)