



SYLLABUS

Your Course Learning Plan

Suspension and Steering Systems

85302AA

A. General Course Information

Course description: The Steering and Suspension students of UAW-LETC will successfully complete a series of activities that will meet the needs of Automotive Dealerships and the aftermarket while following guide lines of the National Automotive Training and Education Foundation (NATEF). These activities will consist of, but not limited to, diagnostics, repair and/or replacement, and adjustment to factory specifications. These activities will take place in the classroom and shop, consisting of written and hands-on exercises. Each phase will have its guidelines and time period. We will cover some areas with more detail than other's depending on the demand for that area.

Prerequisites: Technical Introduction to Dealerships: Module 7, Steering Systems Module 8, and Suspension Systems. (*Refer to TID Curriculum for more information*)

Organization: This is a lecture / shop course in which topics are presented by the instructor, shop assignments are explained and assigned projects are completed by students both during class and shop time. Objective quizzes are given at the completion of each section and there is a comprehensive final exam. When students have completed this course they generally have the same level of expertise as those who have experience in the automotive industry. Initial emphases are on the use of equipment and fundamental procedures.

Course objectives:

1. Demonstrate the skill to diagnose and repair automotive suspension, steering / tire and wheel systems using approved resources, tools, and procedures.
2. Demonstrate a working understanding of suspension, steering / tire and wheel system design and operation.
3. Exhibit the skill to perform Steering, suspension / tire and wheel system service.
4. Explain and demonstrate the procedures for performing alignments.

Textbooks / Software:

1. Toyota Course 453, Technician Handbook
2. Auto Suspension and Steering Textbook.
3. Video Library.

B. Course Content and Outcomes

- Course content:**
1. Tire and Wheel Basics
 2. Tire and Wheel Service
 3. Suspension System Basics
 4. Suspension System Components
 5. Front Suspension Systems
 6. Rear Suspension Systems
 7. Electronic Suspension Systems/Service
 8. Steering System Basics
 9. Wheel Alignment Principles
 10. Wheel Alignment Procedures
 11. Front Suspension System Service
 12. Rear Suspension System Service
 13. Driveline and Wheel Components/Service
 14. Steering Linkage and Manual Steering Gear Service
 15. Power Steering and Four-Wheel Steering Service

- Learning outcomes:** Upon successful completion of this course the student will:
1. Demonstrate and practice personal responsibility skills required at the workplace.
 2. Practice interpersonal communication and problem solving skills.
 3. Utilize social and personal management skills.
 4. Implement a diagnostic strategy that will aid in identification and location of faults in the Toyota Wheel and Tire system.
 5. Demonstrate the skill to follow proper procedures in the repair of Toyota Wheel and Tire systems.
 6. Implement a diagnostic strategy that will aid in identification and location of faults in the Toyota Steering system.
 7. Demonstrate the skill to follow proper procedures in the repair of Toyota Steering systems.
 8. Possess the skills necessary to perform Suspension and steering system service and repair in line with the highest quality standards in the automotive industry.

- Grading (credit) criteria:** Course will be weighted as follows. Worksheets 40%, Quizzes 30%, homework 10%, and final exam 20%.
- Worksheets will be assigned almost every day. Worksheets will be due at the end of each day. Grading will be based on a performance rating of "2" (Proficient) and "3" (Proficient, able to teach others) with a minimum rating of "2" being required for passing. (Extra credit will be given for a rating of "3").
- There will be many objective quizzes given relating to current topics. Grading will be based on percentage of correctly answered questions.
- The final exam will be comprehensive relating to all topics covered in the course. Questions are written with heavy emphasis on critical thinking and diagnostic skills. A grade of 80% is required for passing.

C. Class/Shop Policies

Student Expectations:

1. Be on time for the start of class and return to class for final roll call.
2. Wear safety glasses in the shop at all times.
3. Appropriate working attire shall be worn.
4. Access to shop vehicles only as authorized by the instructor.
5. No cell phones or other electronic devices.
6. Participate in classroom discussions.
7. Observe classroom etiquette.
8. Participate in shop clean up.
9. Attendance to shop activities in assigned area.
10. Approval by instructor required prior to being absent from assigned area.
11. Clean all tools prior to returning them to the tool crib.
12. Follow all safety rules; be concerned with your safety and the safety of others.
13. Report all injuries regardless of the nature or severity to the instructor.

D. Other resources

Online resources: Techinfo.Toyota.Com
 GMTraining.Com

Tentative Schedule

DAY	TASK	TOPIC/ACTIVITY
1	Worksheet SS-F2, Inspect Tires, Check and Adjust Air Pressure Worksheet SS-F1, Identify and Diagnose Tread Wear Patterns	Tire and Wheel Basics Anatomy of a Tire Quiz: Tire and Wheel Basics Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 1, Tire and Wheel Service Basics, pages 1-1 through 1-12 Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 2, Tire and Wheel Service, pages 2-1 through 2-23
2, 3	Toyota Worksheet 2-1, Checking Machine Calibration Toyota Worksheet 2-2, Typical Dynamic Balance Procedure Toyota Worksheet 2-3, Adhesive Weight Balancing Toyota Worksheet 2-4, Measuring Tire Run-out Toyota Worksheet 2-5, Measuring Wheel Run-out Toyota Worksheet 2-6, Measuring Hub Run-out Toyota Worksheet 2-7, Road Force Variation Measuring Worksheet SS-F4-10, Tire Rotation Worksheet SS-F3-6, Diagnose Wheel/Tire Vibrations, Shimmy, Noise and Tire Pull	Tire and Wheel Service Tire Rotation Wheel Balance Tire & Wheel Run-out Replacement & Repair Quiz: Tire and Wheel Service Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 2, Tire and Wheel Service, pages 2-24 through 2-44

<p>2, 3 continued</p>	<p>Worksheet SS-F13, Inspect, Diagnose and Calibrate Tire Monitoring System Worksheet SS-F8-9-10-11-12, Dismount, Inspect, and Remount Tire</p>	
<p>4</p>	<p>Worksheet SS-B2, Vehicle Service Information</p>	<p>Suspension System Basics</p> <p>Quiz: Suspension Designs</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 3, Suspension System Basics, pages 3-1 through 3-16</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 1, Basic Suspension and Steering System Operation, pages 11-18 and 20-23</p>
<p>5</p>	<p>Toyota Worksheet 4-2: Front Suspension Component Inspection Worksheet SS-D1, Ball Joint Inspection Worksheet SS-D2, Spring Inspection</p>	<p>Suspension System Components</p> <p>Quiz: Suspension Components</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 3, Suspension System Basics, pages 3-17 through 3-27</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 4, Common Suspension System Components, pages 67-84</p>
<p>6</p>	<p>Worksheet SS-D4, McPherson Strut/Shock Absorber Inspection</p>	<p>Front Suspension Systems Rear Suspension Systems Electronic Suspension Systems/Service</p> <p>Quiz: Front and Rear Suspensions</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 5, Front Suspension Systems, pages 85-101</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 7, Rear Suspension Systems, pages 127-146</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 14, Electronic Suspension and Steering Systems, pages 301-310</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 15, Electronic Suspension and Steering Service, pages 319-330</p>
<p>7</p>	<p>Toyota Worksheet 8-2, Chassis Inspection</p>	<p>Steering System Basics</p> <p>Quiz: Steering System Basics and Components</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 5, Steering System Basics, pages 5-1 through 5-7</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 9, Steering Systems, pages 174-182</p>

8		<p>Steering System Basics (continued)</p> <p>Quiz: Power Steering and Steering Columns</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 5, Steering System Basics, pages 5-8 through 5-27</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 9, Steering Systems, pages 167-173 and 183-200</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 14, Electronic Suspension and Steering Systems, pages 310-315</p>
9	<p>Toyota Worksheet 7-1, Alignment Geometry</p> <p>Toyota Worksheet 7-3, Interpreting Wheel Alignment Values and Service Information</p>	<p>Wheel Alignment Principles</p> <p>Quiz: Alignment Basics</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 7, Vehicle Dynamics and Handling, pages 7-1 through 7-31</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 16, Wheel Alignment Principles, pages 343-360</p>
10, 11	<p>Toyota Worksheet 9-1, Wheel Alignment Demonstration</p> <p>Toyota Worksheet 10-2, Diagnosing Using SAI and IA</p> <p>Toyota Worksheet 10-1, Measuring Steering Axis Inclination and Included Angle</p> <p>Worksheet SS-E2, Alignment</p>	<p>Wheel Alignment Procedures</p> <p>Quiz: Alignment Procedures</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 17, Wheel Alignment Procedures, pages 361-389</p>
12	<p>Toyota Worksheet 4-1, Dry Park/Steering Linkage Inspection</p> <p>Toyota Worksheet 4-2, Front Suspension Component Inspection</p>	<p>Front Suspension System Service</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 4, Suspension System Service, pages 4-1 through 4-11</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 6, Front Suspension System Service, pages 103-108</p>
13	<p>Worksheet SS-D1j, R&R Strut Assembly Spring</p> <p>Worksheet SS-D3a, R&R Shock Absorber</p> <p>Worksheet SS-E2, Alignment</p>	<p>Front Suspension System Service (continued)</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 6, Front Suspension System Service, pages 110-113</p>
14	<p>Worksheet SS-D1e, R&R Ball Joints</p> <p>Worksheet SS-D1f, R&R Steering Knuckle</p> <p>Worksheet SS-E2, Alignment</p>	<p>Front Suspension System Service (continued)</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 6, Front Suspension System Service, pages 113-117</p>
15	<p>Worksheet SS-D1c, R&R Upper/Lower Control Arms</p> <p>Worksheet SS-E2, Alignment</p>	<p>Front Suspension System Service (continued)</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 6, Front Suspension System Service, pages 117-121</p>

16	<p>Worksheet SS-D7, Solid and Twin I-Beam Suspension (IN-CLASS)</p> <p>Worksheet SS-D1i, R&R Stabilizer Bar and Bushings</p> <p>Worksheet SS-D1d, R&R Strut Rods and Bushings</p> <p>Worksheet SS-E2, Alignment</p> <p>Worksheet SS-D8, Kingpin Service (IN-CLASS)</p>	<p>Front Suspension System Service (continued)</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 6, Front Suspension System Service, pages 121-125</p>
17	<p>Worksheet SS-D6, Rear Suspension Component Inspection</p>	<p>Rear Suspension System Service</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 4, Suspension System Service, pages 4-13 through 4-26</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 8, Rear Suspension System Service, pages 147-151</p>
18, 19	<p>Toyota Worksheet 4-3, Adjusting Ride Height – Rear Air Suspension</p> <p>Worksheet SS-D2b, R&R Transverse Link</p> <p>Worksheet SS-E2, Alignment</p>	<p>Rear Suspension System Service (continued)</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 8, Rear Suspension System Service, pages 151-165</p>
20	<p>Worksheet SS-D3b, Remove, Inspect and Replace Wheel Bearings</p> <p>Worksheet SS-D9, Drive Shaft Inspection</p> <p>Worksheet SS-D10, CV Axle Inspection</p>	<p>Driveline and Wheel Components/Service</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 12, Driveline and Wheel Components, pages 251-260</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 13, Driveline and Wheel Service, pages 271-276 and 284-295</p>
21, 22	<p>Toyota Worksheet 6-1, Toyota Dry Park Inspection</p> <p>Toyota Worksheet 8-1, Test Drive</p> <p>Worksheet SS-C4, Diagnose Power Steering Gear (non Rack and Pinion)</p> <p>Worksheet SS-C18, R&R Tie-Rods (non Rack and Pinion)</p> <p>Worksheet SS-C9, R&R Tie-Rods (Rack and Pinion)</p> <p>Worksheet SS-C17, R&R Parallelogram Steering Components</p> <p>Worksheet SS-C5, Diagnose Rack and Pinion Steering Complaint</p> <p>Worksheet SS-E2, Alignment</p>	<p>Steering Linkage and Manual Steering Gear Service</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 6, Steering System Service, pages 6-1 through 6-3</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 10, Steering Linkage and Manual Gear Service, pages 203-207 and 212-215</p>
23	<p>Worksheet SS-C8, R&R Rack and Pinion</p> <p>Worksheet SS-E2, Alignment</p>	<p>Steering Linkage and Manual Steering Gear Service (continued)</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 10, Steering Linkage and Manual Steering Gear Service, pages 215-220</p>

24	<p>Worksheet SS-C6, Inspect Steering Column</p> <p>Worksheet SS-C3, Steering Column Diagnosis</p> <p>Worksheet SS-C1, Supplemental Restraint System</p> <p>Worksheet SS-C2, R&R Steering Wheel</p> <p>Worksheet SS-E2, Alignment</p>	<p>Steering Linkage and Manual Steering Gear Service (continued)</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 10, Steering Linkage and Manual Steering Gear Service, pages 204-205 and 207-212</p>
25, 26	<p>Toyota Worksheet 6-2, Power Steering Fluid/Belt Inspection</p> <p>Worksheet SS-C12, Diagnose Power Steering Leaks</p> <p>Worksheet SS-C16, R&R Power Steering Hoses</p>	<p>Power Steering and Four-Wheel Steering Service</p> <p>Text: Toyota Course 453, Suspension, Steering & Handling Technician Handbook, Section 6, Steering System Service, pages 6-4 through 6-8</p> <p>Text: Auto Suspension and Steering Textbook, Chapter 11, Power and Four-Wheel Steering Service, pages 225-235, 239, and 243-249</p>