AORSI Instructor Guide

Course Title: Suspension, Steering & Brakes (SSB)

Duration: 6 Hours (classroom + garage/shop setting)

Audience: Off-road operators, technicians, and instructors

Course Overview

This course explores the systems that give off-road vehicles their control and stability. Students gain knowledge of how suspensions absorb impact, how steering systems adapt to terrain, and how brake systems provide stopping power. By understanding these critical systems, operators can improve safety, vehicle longevity, and confidence in challenging environments.■179†AORSI-100-SSB Workbook†L1-L9■

Learning Objectives (Instructor Notes)

- Compare different suspension systems (solid axle, independent, articulated).

- Understand how steering geometry affects maneuverability.

- Identify brake system components and perform basic checks.

- Recognize how off-road conditions stress these systems.

Module 1: Suspension Types & Functions (1.5 hours)

- Teach solid axle, independent, and specialty systems like long-travel or air suspensions.

- Course Design Suggestion: Compare ride comfort between solid axle and independent suspensions.

- Exercise: List three advantages of solid axle suspensions in off-road settings.

- Reflection: Why does suspension design influence both safety and driver fatigue?■179†AORSI-100-SSB Workbook†L11-L24■

Module 2: Steering Systems – Rack & Pinion vs Hydraulic Assist (1.5 hours)

- Teach rack & pinion vs hydraulic assist steering, plus geometry (caster, camber, toe).

- Course Design Suggestion: Students measure toe-in and caster angles.

- Exercise: Compare pros/cons of rack & pinion vs hydraulic assist for rock crawling.

- Reflection: How does improper steering geometry increase driver risk?■179†AORSI-100-SSB Workbook†L26-L38■

Module 3: Brakes – Disc, Drum, ABS, and Off-Road Considerations (1.5 hours)

- Teach disc vs drum brakes, ABS benefits and drawbacks off-road.

- Course Design Suggestion: Conduct braking distance test on dirt vs pavement.

- Exercise: Identify three signs of brake wear needing immediate service.

- Reflection: Why might ABS be disabled or modified in off-road builds?■179†AORSI-100-SSB Workbook†L40-L53■

Module 4: Diagnostics, Wear Points, and Field Adjustments (1.5 hours)

- Teach wear points: bushings, ball joints, tie rods, brake lines. Show adjustments.

- Course Design Suggestion: Stage common faults for students to diagnose and correct.

- Exercise: Draft daily inspection checklist for suspension, steering, and brakes.

- Reflection: Why does preventative inspection save both time and cost compared to repairs?■179†AORSI-100-SSB Workbook†L55-L68■

Instructor–Student Alignment Chart

This chart aligns instructor activities with student workbook exercises for easy reference.■179†AORSI-100-SSB Workbook†L11-L68■

Module	Instructor Focus	Student Workbook Activity
1: Suspension Types	Show suspension models and stress points	List solid axle advantages■179†AORSI-100-SSB Workbook
2: Steering Systems	Show linkage wear and geometry demos	Compare steering types for rock crawling■179†AORSI-100-
3: Brakes	Provide worn/new pads and rotors for practice	Identify brake wear indicators■179†AORSI-100-SSB Workb
4: Diagnostics	Stage faults (tie rods, pads, shocks) for correction	Draft inspection checklist■179†AORSI-100-SSB Workbook†

Final Assessment

Task: Conduct a hands-on inspection of suspension, steering, and brake systems. Identify wear points, complete a diagnostic checklist, and demonstrate proper adjustment or replacement of one component. Written exam includes sample questions from modules 1–4.■179†AORSI-100-SSB Workbook†L70-L79■

Instructor Preparation Checklist

- Provide suspension cutaways or models.
- Prepare alignment tools for steering checks.
- Supply worn and new brake parts for inspection.
- Stage sample faults for diagnostic practice.

Suggested Timing

- Introduction – 10 min
- Module 1 – 90 min
- Module 2 – 90 min
- Module 3 – 90 min
- Module 4 – 90 min
- Final Assessment – 30 min
- Wrap-up & Questions – 10 min