AORSI Instructor Guide

Course Title: Off-Road Vehicle Technology Integration (IT)

Duration: 6 Hours (lab + field recommended)

Audience: Off-road operators, technicians, and instructors

Course Overview

This course covers the role of modern technology in off-road vehicles, from GPS and sensors to telematics and off-grid power systems. Students learn how to safely integrate, maintain, and troubleshoot these systems, ensuring reliability during demanding field operations.

Learning Objectives (Instructor Notes)

- Identify key onboard and aftermarket electronic systems. (Tip: Use real vehicles for demonstration).

- Use GPS, trail apps, and sensors effectively. (Tip: Include both online and offline navigation methods).

- Troubleshoot common electronic issues in the field. (Tip: Provide mock failures for practice).

- Manage off-grid power and communications equipment. (Tip: Highlight redundancy in power planning).

Module 1: Overview of Vehicle Electronics (OEM & Aftermarket) (1.5 hours)

- Explain OEM features (traction control, ABS) vs aftermarket upgrades (lighting, winch controllers, telematics).

- Course Design Suggestion: Students map electrical systems and use multimeters for testing.

- Exercise: Create diagram of five aftermarket upgrades with purpose.

- Reflection: How can poor electrical integration affect safety?

Module 2: Navigation & Trail Tech: GPS, Apps, Sensors (1.5 hours)

- Discuss GPS units, apps, sensors, and offline mapping.

- Course Design Suggestion: Field exercise using GPS and trail apps, compare accuracy.

- Exercise: List three advantages of offline GPS apps.

- Reflection: How do sensors improve safety and decision-making?

Module 3: Off-Grid Power Systems (Solar, Dual-Battery, Inverters) (1.5 hours)

- Teach solar setups, dual-battery systems, inverters, and power budgeting.

- Course Design Suggestion: Lab designing solar + dual-battery setup with calculations.

- Exercise: Design power budget for two-day trip with radios, GPS, lights.

- Reflection: Why is redundancy important in power systems?

Module 4: Troubleshooting & Field Repairs (1.5 hours)

- Explain systematic troubleshooting for blown fuses, drained batteries, corroded connectors, faulty sensors.

- Course Design Suggestion: Troubleshooting stations with simulated failures.

- Exercise: Identify three common electrical problems and troubleshooting steps.

- Reflection: How can operators prepare toolkits for field repairs?

Final Assessment

Task: Participate in a hands-on troubleshooting scenario where systems fail during a simulated trail ride. Students must diagnose issues, apply corrective measures, and justify solutions. Additionally, complete quiz:

- What are three differences between OEM and aftermarket electronics?

- Why is offline navigation capability important in trail apps?

- What role does a dual-battery system play in off-grid power management?

- List two common field repair challenges and solutions.

- How can regular inspections reduce risk of failures on the trail?

Instructor Preparation Checklist

- Prepare vehicles with visible OEM and aftermarket electronics.

- Gather GPS units, trail apps, and sensors for field exercises.

- Provide solar panels, dual-battery systems, and inverters for labs.

- Set up troubleshooting stations with simulated electrical failures.

Suggested Timing

- Introduction – 15 min

- Module 1 – 90 min

- Module 2 – 90 min

- Module 3 – 90 min

- Module 4 – 90 min

- Final Assessment – 30 min

- Wrap-up & Questions – 15 min