AORSI-100-NAV Workbook (Expanded Edition)

Overview

This course provides skills in safe route planning, terrain assessment, and navigation using both digital and analog tools. Students learn to prepare for varying conditions and anticipate hazards. Navigation is one of the most important competencies in off-road operations, as even the most capable vehicles and drivers can be compromised by poor route selection or disorientation. This workbook is designed to provide structured guidance for both learners and instructors, combining technical knowledge with practical exercises.

Learning Objectives

- Use GPS, maps, and compass for off-road navigation.
- Assess routes based on vehicle type and terrain conditions.
- Identify and mitigate environmental and safety risks.
- Develop emergency backup plans for navigation failures.

Module 1: Navigation Tools – GPS, Apps, Maps, Compass

Modern navigation relies on both digital and analog tools. GPS devices and mobile apps provide real-time precision, but electronics are vulnerable to battery failure, poor satellite reception, or software errors. Maps and compasses remain reliable, but require training and practice to use effectively. Students should develop fluency in switching between tools to ensure safe navigation.

Instructor Guidance: Demonstrate each tool in a classroom setting, followed by practice outdoors. Provide topographic maps and compasses to ensure students learn analog techniques.

Course Design Suggestion: Run a drill where students must navigate a short course with GPS only, then repeat using only map and compass to compare accuracy and confidence.

Exercise: Plot a 5-mile off-road route on a map using a compass and then transfer it into a GPS unit.

Reflection Question: Why is redundancy in navigation methods critical for safety?

Module 2: Route Selection & Terrain Suitability

Route planning requires balancing terrain challenges with vehicle and driver capabilities. Students must learn how slope, soil type, obstacles, and seasonal conditions influence route selection. They should also account for convoy dynamics, ensuring routes are manageable for the least capable vehicle in the group.

Instructor Guidance: Present multiple potential routes on maps and discuss pros/cons of each. Emphasize reading contour lines, water crossings, and choke points.

Course Design Suggestion: Have students plan a route for a mixed group of stock SUVs and modified off-road trucks, considering recovery access and safety exits.

Exercise: Compare two possible routes through hilly terrain—one shorter but steeper, the other longer but gradual. Which would you choose and why?

Reflection Question: Why must route plans always account for the least capable vehicle in the group?

Module 3: Hazard Identification & Risk Management

Navigation is not just about direction—it is about anticipating risks along the way. Hazards may include flash floods, washouts, mud pits, avalanche zones, or wildlife activity. Students must learn to identify and assess hazards using weather data, seasonal knowledge, and local reports. Risk management involves making go/no-go decisions based on safety.

Instructor Guidance: Use regional hazard examples (desert flash floods, mountain avalanches, swampy terrain) to connect theory to real-world risks.

Course Design Suggestion: Assign each group a scenario (e.g., navigating after heavy rain) and have them identify hazards and propose mitigations.

Exercise: Develop a hazard matrix for a trip through desert terrain with seasonal flash flood risks.

Reflection Question: How does hazard anticipation improve overall navigation safety?

Module 4: Contingency Planning & Group Safety

Even the best navigation plans can fail due to equipment breakdowns, blocked trails, or unexpected weather. Contingency planning ensures that when plans fail, safety is preserved. Backup plans include alternative routes, rally points, extra supplies, and redundant communication. Group safety requires clear communication protocols, designated navigation leaders, and ensuring no vehicle becomes isolated.

Instructor Guidance: Stress the importance of pre-trip safety briefings where roles and rally points are established.

Course Design Suggestion: Create a role-play scenario where a GPS unit fails mid-route, requiring the group to switch to compass navigation and regroup at a rally point.

Exercise: Draft a contingency plan for a group of six vehicles where the primary route is blocked by a landslide.

Reflection Question: Why is group discipline essential when switching to contingency navigation plans?

Final Assessment

Task: Participate in a field navigation exercise where students must successfully navigate a course using both GPS and map/compass. Each student will also produce a written route plan for a future off-road trip, including hazard identification and contingency options. Additionally, answer the following sample exam questions:

1. Why must off-road operators be proficient in both digital and analog navigation methods?

2. How does vehicle capability influence route selection?

3. What are three hazards that must be considered in off-road navigation planning?

4. What elements should be included in a contingency navigation plan?

5. How can strong group communication improve navigation safety?

Duration: 6 hours (with a 2-hour field exercise)