



## **“WAYFINDER” COURSE**

### **ORIENTATION, TOPOGRAPHY, AND CARTOGRAPHY COURSE**

#### **MODULE I**

##### **Specific Cartography**

- The Topographic Map.
- Contour Lines: Interpretation of Relief and Graphic Representation Contour Interval.
- Differences in Level or Elevation. Elevation of a Point and Calculation of the Elevation of a Point by Interpolation, Graphic Calculation of Slopes.
- Calculation of Distances on Topographic Maps.
- Topographic Maps for Orientation: Scale and Specific Symbols.

#### **MODULE II**

##### **Angles on the Ground and on a Plane**

- Cardinal Directions.
- Azimuth
- Geographic Poles and Magnetic Poles.
- Magnetic Meridian.
- Magnetic Bearing and Declination. Annual Variation of Magnetic Declination.

## **MODULE III**

### **Orientation Techniques with a Compass**

- Characteristics, Components, Operation, Types, and Applications Limitations.
- Geographic and magnetic north.
- Declination and inclination.
- Combined use of compass and map: map orientation with the compass, land navigation using compass and map.
- Physical orientation on the ground with the compass: determining the bearing.
- Materials and elements that alter the proper functioning of the compass.
- Land navigation using the compass and map.

## **MODULE IV**

### **Orientation techniques with GPS**

- Satellite constellation: tracking satellites and codes emitted by satellites.
- Characteristics, operation, types, and limitations of GPS.
- Coordinates for GPS: taking and entering them into the GPS.
- Satellite-based navigation systems (SBS).
- Navigation with GPS and the waypoint concept: setting waypoints and navigating them.

- Combined use of GPS and map. Map orientation with the compass, land navigation using GPS and map.
- GPS configuration.
- GPS and altitude measurement.
- Complementary devices that aid orientation. Uses and applications. Altimeter, pedometer, inclinometer, and curvimeter.

## **MODULE V**

### **Orientation Techniques Without Auxiliary Instruments**

- Earth's Movements. The seasons, day length, and solar time.
- References for orientation by the sun. Shadow method, clock method, others.
- References for nighttime orientation: the moon and lunar phases, star constellations, other references.
- References for orientation by signs. natural and conventional landmarks.

## **MODULE VI**

### **Navigation by Signs**

- The Sun as an Emergency Guide. Stick and Shadow Method, determination of the East-West axis.
- The Analog Clock. Using the hands to find South (Northern Hemisphere).
- Reading Vegetation (Bio-Indicators), Moss and Lichen

Myths vs. Reality (orientation according to humidity and shade).

- Branch Growth. The search for light (phototropism) and its relationship with the South.
- Tree Bark. Differences in texture and thickness depend on exposure to wind and sun.
- Geology and Terrain. Sunny and shady slopes, hillside inclination affects vegetation and snow, etc.
- Wind Erosion. Identification of prevailing winds on rocks and dunes.
- Biological Evidence (Fauna). Anthills and Burrows, orientation of entrances for thermal protection.
- Routes of Movement. Following animal tracks towards water sources or more passable terrain.
- Dead Reckoning and Course of Fortune. Maintaining a Straight Line, use of forward and backward reference points (backsighting).
- Pacing. Estimating distances without instruments, correct use of a pacing device.

## **MODULE VI**

### Celestial and Night Navigation

- Fundamentals of the Celestial Spheres. Apparent movement of the stars (Earth's rotation). Identification of the cardinal points in the dark.

- Locating North. The Northern Hemisphere. The Big Dipper and Cassiopeia: The "guides" to finding Polaris. The North Star (Polaris), how to locate it and measure the approximate latitude.
- Locating South. The Southern Hemisphere, the Southern Cross (Crux).

Identification and extension of the major axis. Pointers and the South Celestial Pole. Verification methods.

- Navigation with the Moon. Lunar phases, how to determine East/West according to illumination. The "Crescent" method, joining the points (horns) of the moon to find South.
- The Star Clock. Use of the constellations to calculate the passage of time (estimation of remaining daylight hours). Identification of Orion (the "Hunter") as an indicator of the celestial equator.
- Night Walking Techniques. Preservation of night vision (use of red light). Navigation by silhouettes and reliefs against the sky.

## **MODULE VI**

### **Orientation Strategies**

- Precise Orientation Techniques.
- Shallow Orientation Techniques.
- Orientation Techniques in Reduced Visibility, Intentional Error, Following the Contour Line, Reverse Bearing.

**END OF COURSE**