Accredited Africa Training Institute for Capacity Development
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COURSE BROCHURE

Demonstrate An Understanding Of The Principles Of Operation And Use Of Radio AIDS In Air Navigation Training

Law, Military Science and Security / Safety in Society

Unit Standard 120059 · NQF Level 5 · 8 Credits · 5 Days

COURSE OVERVIEW

This course provides learners with a comprehensive understanding of the principles of operation and use of radio aids in air navigation training. It covers the fundamental concepts of radio navigation systems, their applications in aviation, and the procedures for their effective use.

Category	Law, Military Science and Security
Subfield	Safety in Society
Unit Standard	120059
Accreditation	SAQA Accredited · NQF Level 5 · 8 Credits
Duration	5 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS — verifiable online

LEARNING OUTCOMES

- Explain the basic principles of radio wave propagation and their application in air navigation.
- Describe the operation and use of various radio navigation aids, including VOR, DME, ILS, and NDB.
- Apply procedures for interpreting and utilizing radio navigation information in flight operations.
- Analyze the limitations and accuracy of different radio navigation systems.
- Demonstrate the ability to troubleshoot common issues related to radio navigation aids.
- Evaluate the safety implications of using radio aids in air navigation.

COURSE OUTLINE

Day 1: Introduction to Radio Navigation Principles

- Overview of radio navigation history and importance in aviation.
- Fundamental radio wave theory: frequency, wavelength, amplitude, and phase.
- Modulation techniques: AM, FM, and their applications in navigation.
- Navigation system components: transmitters, receivers, antennas, and displays.
- Principles of bearing measurement (VOR, ADF) and distance measurement (DME).
- Introduction to position fixing using triangulation and multilateration.
- Comparison of ground-based vs. satellite-based systems.
- Safety and regulatory considerations in radio navigation.

Day 2: Ground-Based Navigation Aids – VOR, DME, NDB

- VOR system: principle of operation, ground station components, and cockpit instruments.
- VOR radial selection and interpretation, TO/FROM indication.
- DME system: interrogation and reply, distance calculation, and accuracy.
- Combined VOR/DME for position fixing (rho-theta navigation).
- NDB/ADF: principle of loop and sense antennas, bearing display.
- ADF errors: quadrantal error, coastal refraction, and night effect.
- Practical exercise: plotting positions using VOR/DME and NDB.
- Regulatory requirements and flight procedures for ground-based aids.

Day 3: Instrument Landing System (ILS) and Precision Approaches

- ILS system overview: localizer, glide slope, and marker beacons.
- Localizer: frequency, modulation, and course alignment.
- Glide slope: principle, coverage, and angle.
- Marker beacons: outer, middle, and inner markers – indications and use.
- ILS categories (I, II, III) and decision heights/visibility minima.
- ILS display interpretation on HSI, PFD, and raw data.
- ILS limitations: terrain effects, multipath, and critical areas.
- Practical exercise: ILS approach procedure and missed approach.

Day 4: Satellite-Based Navigation – GPS and GNSS

- GNSS overview: GPS, GLONASS, Galileo, and BeiDou constellations.
- GPS principle: satellite ranging, trilateration, and time synchronization.
- GPS signals: L1, L2, and civil frequencies; code and carrier phase.
- Sources of error: ionospheric delay, satellite clock, ephemeris, and multipath.
- Differential GPS (DGPS) and augmentation systems (WAAS, EGNOS).
- GPS receiver operation: acquisition, tracking, and position update.
- GPS integration with VOR/DME/ILS for enhanced navigation.
- Practical exercise: GPS waypoint entry and route planning.

Day 5: Advanced Applications and Integrated Navigation Systems

- RNAV and RNP: definitions, accuracy requirements, and operational approvals.
- Flight Management System (FMS): sensor blending, waypoint management, and performance.
- ADS-B: principle, data content, and integration with navigation.
- Multi-sensor navigation: Kalman filtering and fault detection.
- Future trends: GNSS integrity, GBAS, and SBAS for precision approaches.

- Practical exercise: FMS flight plan creation and navigation display interpretation.
- Troubleshooting common navigation errors and equipment failures.
- Course review and assessment: scenario-based questions and practical test.

ASSESSMENT & CERTIFICATION

Delegates are assessed through exercises and a final test. A mark of **50% or above** earns an **AATICD Certificate of Completion**, issued digitally with a unique verification code. This course carries **8 NQF credits** at **NQF Level 5**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 24,200.00	**R 24,200.00**
1	In-House	R 31,400.00	**R 31,400.00**
1	On-Campus (Pretoria)	R 36,200.00	**R 36,200.00**

UPCOMING SESSIONS

Start	End	Method	Venue
10 Aug 2026	14 Aug 2026	On-Campus	Durban, South Africa
10 Aug 2026	14 Aug 2026	On-Campus	Abu Dhabi, UAE
10 Aug 2026	14 Aug 2026	On-Campus	Pretoria, South Africa
10 Aug 2026	14 Aug 2026	On-Campus	Dubai, UAE
10 Aug 2026	14 Aug 2026	On-Campus	Cape Town, South Africa
10 Aug 2026	14 Aug 2026	On-Campus	Mauritius
17 Aug 2026	21 Aug 2026	On-Campus	Dubai, UAE
17 Aug 2026	21 Aug 2026	On-Campus	Pretoria, South Africa

Contact us if no suitable date is listed — on-demand sessions can be arranged for groups.

HOW TO GET A QUOTE OR APPLY

1. **Get an instant quotation online:** visit **www.aaticd.co.za**, open the page for this course (Unit Standard 120059) and click **Get A Quote / Apply**. Select your training method and number of delegates — your quotation is generated immediately and emailed to you with the course brochure attached.
2. **Apply by email:** send the course title, your preferred training method (Online, In-House or On-Campus Pretoria), the number of delegates and your preferred dates to **apply@aaticd.co.za** — our team will reply with a formal quotation.
3. **Apply by phone or WhatsApp:** call **+27 12 004 8389** or WhatsApp **+27 65 077 6310** and we will prepare your quotation and reserve your seats.
4. **Confirm your booking:** accept the quotation and settle the invoice. As soon as payment is confirmed your delegates are enrolled and receive their AATICD LMS login details by email, along with joining instructions for their chosen training method.

Group discounts apply automatically — the more delegates you enrol, the lower the price per delegate. No payment is required to request a quotation.

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