

Civil Aviation Training Institute

Hyderabad – Pakistan

HANDBOOK OF COURSES



SCHOOL OF ELECTRONICS ENGINEERING

LIST OF COURSES

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Basic and Refresher Courses	
Airport Electronics Engineering	48
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AIRPORT ELECTRONICS ENGINEERING COURSE (ICAO NO.163)

OBJECTIVE:

To provide the participants knowledge and skills to guide and supervise installation, operation and maintenance of Aeronautical Electronic equipment.

ELIGIBILITY:

- Electronics Engineering graduates or senior technicians having qualified Aeronautical Radio Maintenance or equivalent and possess 5 years working on electronics systems and equipments.

DURATION: **48 WEEKS** (32 weeks basic plus 4 optional modules, each of 4 weeks duration)

SUBJECTS:

- Solid State Electronics
- Single Side Band system
- Principles of Communication & Radio Waves propagation
- Oscillators
- Principles of Navigational Aids
- Transmitter and Receiver Concepts
- Radio Electronics practical

OPTIONAL MODULES:

- Computer Technology
- Long Range VHF Communication
- Digital electronics
- A.F./R.F Amplifier
- Modulation and De-Modulation Techniques
- Power Supplies
- Transmission line and Antennae
- Test and Measuring Equipment
- Radio Equipment Practical
- Primary & Secondary Radars
- AFTN Messages Switching systems

AERONAUTICAL RADIO MAINTENANCE COURSE (IACO No. 161)

OBJECTIVE:

To provide concepts of Electrical Technology and thorough study of Radio Communication and Navigational Aid equipment commonly used in Civil Aviation to enable Radio Technicians to carry out routine, preventive maintenance and first line corrective maintenance under supervision of qualified Electronics Engineer.

ELIGIBILITY:

- H.S.C. Science or equivalent having aptitude in Electronics.
- Good command to write and speak English language.

DURATION: 48 WEEKS

SUBJECTS:

- Technical Mathematics
- Transmission lines and Antennae
- Test and Measuring Equipment
- A. C. Principles
- Electron Tubes
- Workshop Practice
- Communication Store, procedures
- ICAO Functions and responsibilities
- Digital Electronics
- Power Supplies and Oscillators
- Transmitter and Receiver Circuits
- Principles of Navigational Aids
- Physics
- Principles of Communication & Propagation of Radio Waves
- D.C. Principles
- Technical Drawing
- Communication Operation Procedures
- Administration
- Solid State Device
- A.F./R.F Amplifier
- Modulation and Demodulation Techniques
- Single Side Band Operation

**SOLID STATE DEVICES AND APPLICATION COURSE
(ICAO NO.162)**

OBJECTIVE:

To provide knowledge of characteristics and function of solid state devices and their applications in maintenance and up-keep of electronic equipments.

ELIGIBILITY:

- H.S.C Science having aptitude to understand electronics concepts.
- Good command to write and speak English language.

DURATION: 7 WEEKS

SUBJECTS:

- PN Junction
- Unijunction Transistors
- Thyristors
- Voltage regulators
- Transistor Oscillators
- ICS and their Applications
- Junction Transistor and applications
- Field Effect Transistors
- Coupled amplifiers
- Power Amplifiers
- Multivibrators

SINGLE SIDE BAND MAINTENANCE COURE (ICAO NO.163)

OBJECTIVE:

To provide knowledge of the Single Side Band Communication Principles used for transmission and reception of radio signals so as the trainee is able to maintain and upkeep ISB and DSB techniques based systems.

ELIGIBILITY:

- Applicants must have successfully completed communication equipment maintenance course from any recognized institute or
- Electronics professional with minimum two years practical experience in maintenance work.
- Good command to write and speak English language.

DURATION: 7 WEEKS

SUBJECTS:

- Introduction of SSB Communication
- Amplitude Modulation
- Elements of SSB Operation
- Types of SSB Operation
- Analysis of SSB Signals
- Distortion in Transmitters
- Linear Power amplifiers
- Filters for SSB Operation
- SSB Receivers and Converters
- SSB Communication Systems
- Measurements

DIGITAL TECHNIQUES COURSE (ICAO NO.169)

OBJECTIVE:

To provide knowledge and techniques applied in the advanced electronics digital circuits by providing theoretical and practical training.

ELIGIBILITY:

- Must have completed a course or training in communication maintenance or electronics/electrical engineering.
- Possess adequate knowledge of Semiconductors and Transistors.
- Practical experience in maintenance of electronics equipments.
- Good command to write and speak English language.

DURATION: 4 WEEKS

SUBJECTS:

- Introduction to Digital Techniques
- Boolean Algebra
- Minimization of Switching Networks
- Combinational Logic Circuits
- Flip-Flops.
- Sequential Logic Circuits, Counters and Registers
- Digital Integrated Circuit
- Applications

DIGITAL TECHNIQUES AND MICROPROCESSOR COURSE (ICAO NO.169)

OBJECTIVE:

To provide knowledge of fabrication, design and development of digital devices, circuits and microprocessor based systems.

ELIGIBILITY:

- Completed a course or training in Communication Maintenance or Electronics / Electrical Engineering.
- Possess adequate knowledge of Semiconductors and Transistors
- Practical experience in maintenance of electronics equipment
- Good command to write and speak English language.

DURATION: 12 WEEKS

SUBJECTS:

- Introduction and Orientation
- Number system and codes
- Logic circuits
- Flip-flops
- Digital electronics
- Boolean algebra
- Combinational Logic Circuits
- Sequential Logic Circuits, Counters and Registers
- Digital circuits Applications
- Introduction to Microprocessor
- Microprocessor Architecture
- Application of Microprocessor
- Assembly Language Programming

**RADAR PRINCIPLES COURSE
(IACO No. 165)**

OBJECTIVE:

To provide knowledge of basic principles of operation of primary and secondary radar systems including processing and representation of radar data.

ELIGIBILITY:

- Graduate Electronics Engineers and Electronics Technicians with Five years practical experience in aviation electronics.
- Thorough knowledge of electronics covering solid state devices, digital techniques and microprocessors.
- Good command to write and speak English language.

DURATION: 8 WEEKS

SUBJECTS:

- Electronic components and microwave devices used in radar
- Primary radar
- Secondary radar
- Processing, transmission and display of radar data
- Automated radar in air traffic control systems

DIGITAL VOICE LOGGING SYSTEM (DVLS) OPERATION AND MAINTENANCE COURSE

OBJECTIVE:

To enable trainees

- to understand working principle of Digital Voice Logging System (DVLS) installed at various locations of CAA;
- to operate DVLS Model “**DC Voice Master**” to its optimum performance;
- to evaluate the performance of system by analyzing different aural and visual indications and software checks;
- to diagnose the causes of any abnormal behavior of the system and rectify the same by replacing modules/units or by modifying software parameters in a minimum time; and
- to create archives and store data for longer period.

ELIGIBILITY:

- Electronic Engineering Personnel (PG-04 to PG-06) having successfully completed the course in “**Digital Techniques and Microprocessors**”.
- Good practical experience in the maintenance of electronics equipment.
- Have a good command of English language, both written and spoken.
- Basic computer literacy is mandatory.

DURATION: 12 WEEKS

SUBJECTS:

- Introduction and Orientation
- Number system and codes
- Logic circuits
- Flip-flops
- Digital electronics
- Boolean algebra
- Combinational Logic Circuits
- Sequential Logic Circuits, Counters and Registers
- Digital circuits Applications
- Introduction to Microprocessor
- Microprocessor Architecture
- Application of Microprocessor
- Assembly Language Programming

I.L.S MAINTENANCE COURSE (ICAO NO.164)

OBJECTIVE:

To provide knowledge and skills to operate and maintain Instruments Landing System within the prescribed tolerances.

ELIGIBILITY:

- Successful completion of basic course in electronics (ARM or AEE level)
- Successful completion of Transistor and Solid State Applications Course with minimum 5 years practical experience in Aviation Electronics involving Solid State and Digital Devices.
- Good command to write and speak English language.

DURATION: 8 WEEKS

SUBJECTS:

- Introduction and Orientation
- I.L.S. Principles
- Localizer Equipment
- Glide Slope Equipment preventive maintenance procedures
- Flight Inspection
- Trouble Shooting Techniques

**C.V.O.R (WILCOX,585-B) MAINTENANCE COURSE
(ICAO NO.164)**

OBJECTIVE:

To provide knowledge and skills to operate and maintain a conventional VOR Navigation System within the prescribed tolerances.

ELIGIBILITY:

- Successful completion of basic course in electronics (ARM or AEE level) or
- Successful completion of Transistor and Solid State Applications Course with minimum 5 years practical experience in Aviation Electronics involving Solid State Devices.
- Good command to write and speak English language.

DURATION: 4 WEEKS

SUBJECTS:

- Orientation
- Introduction to CVOR Wilcox 585-B
- Wilcox, 585-B VOR Sub Systems
- Monitor System
- Trouble Shooting Techniques
- Ground Check, Flight Check and Error Analysis
- Preventive Maintenance Procedures

**D.M.E (WILCOX, 596-B) MAINTENANCE COURSE
(ICAO NO.164)**

OBJECTIVE:

To provide knowledge and skills to operate and maintain a Distance Measuring Equipment System within the prescribed tolerances.

ELIGIBILITY:

- Successful completion of basic course in electronics (ARM or AEE level) or
- Successful completion of Transistor and Solid State Applications Course with minimum 5 years practical experience in Aviation Electronics involving Solid State and Digital Devices.
- Good command to write and speak English language.

DURATION: 4 WEEKS

SUBJECTS:

- Orientation
- Introduction to D.M.E Wilcox-596-B
- DME Transponder
- DME Monitor System
- Control and Transfer system
- Power Supply and adjustment procedures
- Tuning and adjustment procedures
- Troubleshooting Techniques
- Preventive Maintenance Procedures

**D.V.O.R. (THOMSON CSF 512-D) MAINTENANCE COURSE
(ICAO NO.164)**

OBJECTIVE:

To provide knowledge and skills to operate and maintain a Doppler VOR Navigation System within the prescribed tolerances.

ELIGIBILITY:

- Successful completion of basic course in electronics (ARM or AEE level) or
- Successful completion of Transistor and Solid State Applications Course with minimum 5 years practical experience in Aviation Electronics in handling Solid State and Digital Devices.
- Good command to write and speak English language.

DURATION: 4 WEEKS

SUBJECTS:

- Orientation
- Introduction to DVOR Thomson CSF-512D
- CSF Thomson 512-D Sub-System
- Monitor System
- Ground Check, Flight Check and Error Analysis
- Tuning and adjustment Procedures
- Trouble Shooting Techniques
- Preventive Maintenance Procedures

**D.M.E. (THOMSON CSF721) MAINTENANCE COURSE
(ICAO NO.164)**

OBJECTIVE:

To provide knowledge and skills to operate and maintain a Distance Measuring Equipment System within the prescribed tolerances.

ELIGIBILITY:

- Successful completion of basic course in electronics (ARM or AEE level) or
- Successful completion of Transistor and Solid State Applications Course with minimum 5 years practical experience in Aviation Electronics involving Solid State & Digital Devices.
- Good command to write and speak English language.

DURATION: 4 WEEKS

SUBJECTS:

- Orientation
- Introduction to DME CSF Thomson 721
- DME Transponder
- DME Monitor
- Control and Transfer System
- Power Supply
- Tuning and Adjustments procedures
- Trouble Shooting Techniques

NON DIRECTIONAL BEACON MAINTENANCE COURSE

OBJECTIVE:

To provide knowledge and skill to maintain, upkeep and operate NDB equipment within prescribed tolerances.

ELIGIBILITY:

- Successful completion of ARM course or equivalent.
- Knowledge of solid state and digital electronics with minimum experience of 2 years on Communication system.
- Good command to write and speak English language.

DURATION: 2 WEEKS

SUBJECTS:

- Introduction and orientation
- Principles of NDB operation
- NDB operating procedures
- Preventive and corrective maintenance procedures

PRIMARY SURVEILLANCE RADAR OPERATION AND MAINTENANCE COURSE

OBJECTIVE:

To provide sufficient theoretical and practical knowledge to Radar Engineers so that they could be able

- To operate the primary radar TA-10K within prescribed tolerances;
- To identify front panel indications, controls, alarms, indications and meter readings and analyze operating performance of the system;
- To identify/ isolate specific problems in case of system un-serviceability;
- To replace defective unit and restore operation of PSR within minimum breakdown time; and
- To implement recommended preventive maintenance procedure.

ELIGIBILITY:

- Must be B.E (Electronics) and have completed Airport Electronics Engineering course; or
- A Technical Officer of PG-8/PG-7 having a maintenance experience of at least 3/5 years on Nav-aids/Telecommunication equipment

DURATION: 8 WEEKS

SUBJECTS:

- Introduction to radar system
- Primary radar equipment TA-10K
- Primary radar operating procedures
- Preventive maintenance procedures

SECONDARY SURVEILLANCE RADAR OPERATION AND MAINTENANCE COURSE

OBJECTIVE:

To provide sufficient theoretical and practical knowledge to Electronics Engineers/Technical officers that they could be able

- To operate and maintain smoothly monopulse Secondary Surveillance Radar RSM-870 with specified tolerances;
- To identify/ isolate specific problems in case of system un-serviceability;
- To replace defective unit and restore operation of SSR within minimum breakdown time; and
- To implement recommended preventive maintenance procedure.

ELIGIBILITY:

- Must be B.E (Electronics) and have completed Airport Electronics Engineering course; or
- A Technical Officer of PG-8/PG-7 having a maintenance experience of at least 3/5 years on Nav-aids/Telecommunication equipment

DURATION: 7 WEEKS

SUBJECTS:

- Explanation of Radar System
- SSR equipment theory
- SSR operating procedure
- Associated equipment
- Preventive maintenance procedures

RADAR DATA PROCESSING AND DISPLAY SYSTEM OPERATION AND MAINTENANCE COURSE

OBJECTIVE:

To provide sufficient theoretical and practical knowledge to Electronics Engineers/Technical officers that they could be able

- To operate Radar Data Processing and Display system (Thomson_CSF Models AIRCAT-200 and AIRCAT-500); within prescribed tolerances;
- To identify front panel indications, controls, alarms and operating status;
- To identify and analyze operating performance, malfunctioning and faults;
- To identify system faults and replace defective unit/module; and
- To carry out preventive maintenance as recommended by the manufacturer.

ELIGIBILITY:

- Must be B.E (Electronics) and have completed Airport Electronics Engineering course; or
- A Technical Officer of PG-8/PG-7 having a maintenance experience of at least 3/5 years on Nav-aids/Telecommunication equipment

DURATION: 6 WEEKS

SUBJECTS:

- Basic Radar Principles
- Radar Display System
- Display Equipments: Architecture & Description
- Preventive Maintenance
- Installation, Testing & Calibration (Practical)
- System Operation and Operational Fault Diagnosis (Practical)

**ADVANCED MICROPROCESSOR TECHNOLOGY COURSE
(ICAO NO.169)**

OBJECTIVE:

To provide knowledge of design, fabrication and development of microprocessor and peripherals, to enable the trainee to diagnose malfunctioning and repair microprocessor bases systems.

ELIGIBILITY:

- Trainee should be an Electronics Engineer or technician.
- Good command to write and speak English language

DURATION: 6 WEEKS

SUBJECTS:

- Architecture and Fabrication of Microprocessor
- Software Development for Microprocessors
- Repair Techniques
- Microprocessor Instruction Sets

TEST EQUIPMENT SELECTION, APPLICATION AND CALIBRATION COURSE

OBJECTIVE:

To provide knowledge skill and techniques to be able to apply and calibrate the test equipment in the maintenance of the electronic equipment at airports.

ELIGIBILITY:

- Electronics engineering graduate or a senior technician with recent field experience.
- Good command to speak and write English language.

DURATION: 6 WEEKS

SUBJECTS:

- Operation of Oscilloscope
- Calibration of oscilloscope
- Operation of Signal generator
- Calibration of Signal generator
- Operation of Frequency
- Calibration of Frequency
- Operation of Radio communication test set
- Calibration of Radio communication test set
- Operation of Thruline watt meter
- Calibration of Thruline watt meter
- Operation of Vector volt meter
- Calibration of Vector volt meter
- Operation of Logic Analyzer

**MAINTENANCE OF AVIATION SECURITY SYSTEM COURSE
(ICAO NO.169)**

OBJECTIVE:

To enable the technical personnel to maintain, upkeep and repair aviation security equipment.

ELIGIBILITY:

- Electronic engineer or senior technician with recent working experience on electronic equipment.
- Good command to write and speak English language.

DURATION: 8 WEEKS

SUBJECTS:

- Metal Detectors
- Hand-held Body search equipment
- Body Screening equipment
- Baggage X-Ray and Display
- Close Circuit TV Surveillance equipment
- TV Surveillance Cameras

MICROSOFT OFFICE 2000

OBJECTIVE:

To provide training to the individuals in office related computer application packages which will help them to organize and automate office work.

ELIGIBILITY:

- Preferably having basic concepts and knowledge of computers.

DURATION: 4 WEEKS

SUBJECTS:

- MS Windows 2000
- MS Word 2000
- MS Excel 2000
- MS Power Point 2000
- Introduction to Internet and E-mail

COMPUTER APPLICATION IN AIRPORT MANAGEMENT (STP)

OBJECTIVE:

To impart sufficient knowledge and hands on practice on the computer to the participants in utilizing commercially available computer programmes which would assist in managing the airport functions.

ELIGIBILITY:

- Trainee must have at least 3 years practical experience in Aviation preferably as an Airport Manager, Air Traffic Controller or any officer from Communication Operations, Finance and Administration.

DURATION: 4 WEEKS

SUBJECTS:

- Application of Word Processing (Word-97) for Airport Management
- Application of Spread sheet (Excel-97) For Airport Management
- Application of Data base (Access-97) For Airport Management