

Curriculum for training in aviation medicine

A BASIC TRAINING IN AVIATION MEDICINE 60 HOURS

1. Introduction to Aviation Medicine 2 hour

History of aviation medicine
Specific aspects of civil aviation medicine
Different types of recreational flying
AME and pilots relationship
Responsibility of aeromedical examiner in aviation safety

2. Basic aeronautical knowledge 2 hours

Flight mechanisms
Man-machine interface, informational processing

Propulsion
Conventional instruments, 'glass cockpit'
Recreational flying
Simulator/aircraft experience

3 Aviation Physiology 10 hours

ATMOSPHERE

Functional limits for humans in flight
Divisions of the atmosphere
Gas laws -physiological significance
Physiological effects of decompression

RESPIRATION

Blood gas exchange
Oxygen saturation
HYPOXIA signs and symptoms
Average time of useful consciousness (TUC)
Hyperventilation signs and symptoms
Barotrauma
Decompression sickness

ACCELERATION

G-Vector orientation
Effects and limits of G-load
Methods to increase gz-tolerance

Positive/negative acceleration
Acceleration and the vestibular system

VISUAL DISORIENTATION

Sloping cloud deck
Ground lights and stars confusion
Visual autokinesis

VESTIBULAR DISORIENTATION

Anatomy of the inner ear
Function of the semicircular canals
Function of the otolith organs
The oculogyral and coriolis illusion
'Leans'

SIMULATOR ILLUSION

Forward acceleration illusion of 'nose up'
Deceleration illusion of 'nose down'
Motion sickness -causes and management

NOISE AND VIBRATION

Preventive measures

4 Ophthalmology 4 hours **including demonstration and practical**

Anatomy of the eye
Relation to aviation duties
Examination techniques;
visual acuity assessment;
visual aids;
visual fields – acceptable limits for certification;

ocular muscle balance;
assessment of pathological eye conditions;
glaucoma
Monocularity and medical flight tests
Colour vision
Methods of testing: pseudoisochromatic plates,
lantern tests, anomaloscopy
Importance of standardization of tests and of test
protocols
Assessment after eye surgery

5 Otorhinolaryngology 3 hours **including demonstration and practical skills**

Anatomy of the systems
Clinical examination in ORL
Functional hearing tests
Vestibular system; vertigo, examination techniques
Assessment after ENT surgery
Barotrauma ears and sinuses
Aeronautical ENT pathology
ENT requirements

6 Cardiovascular system 3 hours
including demonstration and practical skills

Relation to aviation; risk of incapacitation
Examination procedures; ECG, laboratory testing and other special examinations
Cardiovascular diseases:
Hypertension, treatment and assessment
Ischaemic heart disease
ECG findings
Assessment of satisfactory recovery from myocardial infarction, interventional procedures and surgery
Cardiomyopathies; pericarditis; rheumatic heart disease, valvular diseases
Rhythm and conduction disturbances, treatment and assessment
Congenital heart disease; surgical treatment, assessment
Cardiovascular syncope – single and repeated episodes

7. General Medicine 10 hours
including demonstration and practical skills

Respiratory system

Relation to aviation, risk of incapacitation
Examination procedures: spirometry, peak flow, x-ray, other examinations
Pulmonary diseases: asthma, chronic obstructive pulmonary diseases
Infections, tuberculosis
Bullae, pneumothorax;
Treatment and assessment

Digestive system

Relation to aviation, risk of incapacitation
Examination of the system

Gastro-intestinal disorders: gastritis, ulcer disease

Biliary tract disorders

Hepatitis and pancreatitis

Inflammatory bowel disease, Irritable colon

Hernias

Treatment and assessment including post abdominal surgery

Endocrine diseases

Relation to aviation, risk of incapacitation

Endocrine disorders:

Diabetes mellitus type I & II

Diagnostic criteria

Glucose tolerance tests

Anti-diabetic therapy

Operational aspects in aviation

Satisfactory control criteria for aviation

Hyper/hypothyroidism

Pituitary and adrenal glands disorders

Treatment and assessment

Haematology

Relation to aviation, risk of incapacitation

Blood donation aspects

Polycythaemia; anaemias; leukaemias; lymphomas

Platelet disorders

Haemoglobinopathies; geographical distribution; classification; sickling conditions.

Treatment and assessment

Urinary system

Relation to aviation, risk of incapacitation

Action to be taken after discovery of abnormalities in routine dipstick urinalysis e.g

haematuria; albuminuria

Urinary system disorders:

Nephritis; pyelonephritis; obstructive uropathies

Tuberculosis

Lithiasis: single episode; recurrence

Nephrectomy, transplantation, other treatment and assessment

Gynaecology-obstetrics

Relation to aviation, risk of incapacitation

Pregnancy and aviation

Disorders, treatment and assessment

Orthopaedic disorders

Musculoskeletal disorders, including:

Vertebral column diseases

Arthropathies and arthroprosthesis

Disabled pilots

Treatment of musculoskeletal system,
assessment for flying.

Malignant Disease

Relation to aviation, risk of metastasis and
incapacitation

Risk management and waiver decisions

Different methods of treatment and assessment

8 Neurology 3 hours

Relation to aviation, risk of incapacitation

Examination procedures

Neurological disorders:

seizures – assessment of single episode;

epilepsy;

multiple sclerosis;

head trauma;

post-traumatic states;

vascular diseases;

tumours;

disturbance of consciousness – assessment of
single and repeated episodes

Degenerative diseases

Treatment and assessment

9 Psychiatry in Aviation 3 hours

Relation to aviation, risk of incapacitation

Psychiatric examination

Psychiatric disorders: neurosis; personality
disorders; psychosis; organic mental illness;

Drugs, alcohol and substance abuse

Treatment, rehabilitation and assessment

10 Psychology 3 hours

Introduction to psychology in aviation as a
supplement to neuropsychiatric assessment

Methods of psychological examination

Behaviour and personality

Workload management and situational awareness
Flight motivation and suitability
Group social factors
Psychological stress, stress coping, fatigue
Psychomotor functions and age
Mental fitness and training

11 Incidents and accidents, Escape and Survival 1 hour

Accident statistics
Injuries
Aviation pathology, postmortem examination, identification

Escape from aircraft in flight
 aircraft on fire
 aircraft in water
 by parachute

12 Medication and Flying 2 hours

Hazards of medications
Common side effects; prescription medications; over-the-counter medications; herbal medications; 'alternative' therapies
Medication for sleep disturbance

13 Legislation, Rules and Regulations 4 hours

ICAO Standards and Recommended Practices
JAA provisions (Requirements, Appendices, AMCs and IEMs)
Incapacitation: acceptable aeromedical risk of incapacitation; types of incapacitation; 'two communication' rule; operational aspects
Basic principles in assessment of fitness for aviation
Operational and environmental conditions
Use of medical literature in assessing medical fitness; differences between scientific study populations and licensed populations
Flexibility
ICAO Annex 1, paragraph 1.2.4.8,

Accredited Medical Conclusion; consideration of knowledge, skill and experience
 Trained versus untrained crews; incapacitation training
 Medical flight tests.

14 Practical demonstrations of basic aeronautical knowledge 8 hours

15 Concluding items 2 hours

Final examination
 De-briefing and critique

B ADVANCED TRAINING IN AVIATION MEDICINE 60 hours

1 Pilot working environment 6 hours

Commercial aircraft cockpit
 Business jet, commuter flights
 Military aviation:
 low level high speed flying
 high dynamic flight
 night vision devices (NVD)
 forward looking infrared (FLIR)

Professional airline operations
 Fixed wing and helicopter, aerial work
 Air traffic control
 Single-pilot/multi-crew

2 Aerospace physiology 3 hours

Brief review of basics in physiology
 (hypoxia, rapid/slow decompression,
 hyperventilation, acceleration, ejection seat,
 spatial disorientation)

3 Ophthalmology including demonstration and practical skills 4 hours

Brief review of basics

(visual acuity, refraction, colour vision, visual fields, night vision, stereopsis, monocular...)
Class 1 visual requirements
Implications of refractive and other eye surgery
Case review

4 Otorhinolaryngology including demonstration and practical skills 4 hours

Brief review of basics
(barotrauma -ears and sinuses, functional hearing tests..)
Noise and its prevention
Vibration, kinetosis
Class 1 hearing requirements
Case review

5 Dentistry 2 hours

Oral examination including dental formula
Oral cavity, dental disorders and treatment, including implants, fillings, prosthesis etc.
Barodontalgia
Class 1 requirements
Case review

6 Cardiology including demonstration and practical skills 3 hours

Cardiological examination and review of basics

Class 1 requirements
Diagnostic steps in cardiology
Clinical cases

7 General Medicine including demonstration and practical skills 5 hours

Complete physical examination
Review of basics with relationship to commercial flight operations
Class 1 requirements
Clinical cases

8 Neurology/Psychiatry including demonstration and practical skills 4 hours

Brief review of basics

(neurological and psychiatric examination)
Drugs and alcohol
Class 1 requirements
Case review

9 Human Factors in aviation including 8 hours demonstration and practical experience 19 hours

- a. Long haul flight operations
 - flight time limitations
 - sleep disturbance
 - extended/expanded crew
 - jet lag/time zones
- b. Human information processing and system design
 - FMS, PFD, datalink. fly by wire
 - adaptation to the glass cockpit
 - CCC, CRM, LOFT etc.
 - practical simulator training
 - ergonomics
- c. Crew commonality:
 - flying under the same type rating
 - e.g. B737-300, -400, -500
- d. Human factors in aircraft incidents and accidents
- e. Flight safety strategies in commercial aviation
- f. Fear and refusal of flying
- g. Psychological selection criteria
- h. Operational requirements (flight time limitation, exposure to radiation etc.)

10 Incidents and accidents, Escape and Survival 2 hours

Accident statistics
Types of injuries
Aviation pathology, postmortem examination
specific related to aircraft accidents, identification

Rescue and emergency evacuation

11 Hygiene 2 hours

Aircraft and transmission of diseases
Hygiene aboard aircraft:

water supply, oxygen supply, disposal of waste,
cleaning, disinfection and disinsection
Catering
Crew nutrition

12 Tropical medicine 2 hours

Endemicity of tropical disease
Infections diseases (communicable diseases,
sexual transmitted diseases, HIV etc.)
Vaccination of flight crew and passengers
Diseases transmitted by vectors
Food and water-borne diseases
Parasitic diseases.
International health regulations
Personal hygiene of aviation personnel

13 Cabin crew working conditions 2 hours

Cabin environment, workload, duty and rest time

General health conditions

14 Space medicine 1 hour

Microgravity and metabolism, life sciences

15 Concluding items 2 hours

Final examination
De-briefing and critique

C REFRESHER TRAINING IN AVIATION MEDICINE 20 hours

**Refresher course supervised by the NAA
(minimum 6 hours)**

Including updates in clinical aviation medicine,
regulation etc.

Agreed accreditation times for training:

Attendance at International Academy of Aviation and Space Medicine Annual Congresses	Hours of the scientific presentations
---	---

Attendance at Aerospace Medical Association Annual Scientific Meetings	Hours of the scientific presentations
---	---

Other scientific meetings, as organised or approved by AMS of Member State.*	Hours of the scientific presentations
Flight deck experience (a maximum of 5 hours credit per 3 years)	
i. jump seat	(5 sectors -1 hour credit)
ii. simulator	(4 hours -1 hour credit)
iii. aircraft piloting	(4 hours -1 hour credit)

All credited time must be agreed with the AMS.

* A minimum of 6 hours must be under the direct supervision of the AMS.

Abbreviations

CCC Crew Co-ordination Concept
CRM Crew Resource Management
FMS Flight Management System
LOFT Line Oriented Flight Training
PFD Primary Flight Display