



**DOW UNIVERSITY OF HEALTH
SCIENCES**

**POST-GRADUATE DIPLOMA COURSE
IN AVIATION MEDICINE**

CURRICULUM





INTRODUCTION:

Aviation is very progressive and fast expanding industry having both civil & military dimensions. Aviation Medicine which is a branch of Occupational medicine deals with human beings & their working conditions to keep them fit & alert all the time to perform complex tasks in potentially hostile working environment. As the volume of air traffic has risen steeply in recent years, the passenger capacity in the modern aircrafts has also increased exponentially as a result of which frequent air travellers with pre-existing health problems are demanding more inflight services especially on long haul flights for which aviation doctors are consulted and are involved. Specialization in this discipline shall cater physiological, psychological & social aspects of flight crew and other aviation related personnel with the aim to keep the flight safe and comfortable for travelling public.

OBJECTIVE:

The purpose of this curriculum is to develop the following skills amongst the students.

- Awareness of physical, physiological, psychological & social aspect of Aviation related personal.
- Develop skills required for medical examinations of flight crew at the time of induction, during renewal of fitness periodically and after recovery from illnesses to ascertain further fitness for flying duties.
- To adopt preventive measures to cope with in-flight incapacitations with the aim to safeguard health of flight crew and travelling public.
- To participate in aircraft accident investigations and make appropriate recommendations for prevention of further recurrences.
- To work for flight & ground safety both for manpower & equipment at work places.
- To develop communication skills both verbal and written.
- To train doctors for research skills and report writing.
- To train doctors to use computer equipment and inculcate cyber abilities.
- To function as an effective leader of health team, engage with health care research and training aspects of flight crew.



AIM OF PROGRAMME:

The aim of the program is to prepare doctors as aviation medical specialist/flight surgeons acquiring optimal level of professional competence to meet the challenges of 21st century. These aviation medicine qualified and trained doctors will help the airline operators to select and induct medically fit and healthy flight crew for safe operation of aircrafts.

GOALS:

The goal of this diploma course is to produce competent aviation medical specialists/flight surgeons who;

- Shall recognize the health needs of flight crew and carry out professional obligations ethically with an aim to keep highest health profile of flight crew.
- Shall muster competencies required in this specialty at primary, secondary & tertiary levels of healthcare delivery system.
- Shall be aware of contemporary advances and innovations in this discipline
- Shall acquire spirit of scientific inquiry and are oriented to the principles of methodology and epidemiology.
- Shall acquire basic skills of teaching and indoctrination of aviation medicine skills.

COMPONENTS OF THE CURRICULUM:

The major components of curriculum shall be;

- Theoretical knowledge through lectures, seminars, case presentations, tutorials & videos.
- Practical and clinical skills by visiting various aviation related facilities at civil & military bases.
- Writing dissertation and research articles.
- Training in research methodology, medical ethics, oversight safety audits and communication skills.

JOB OPERTUNITIES

- Demand of aviation doctors in Middle East
- Demand of Doctors in private airlines
- Demand of Doctors in civil Aviation



PROGRAM SPECIFICATION– DIPLOMA IN AVIATION MEDICINE



Course Title		Diploma in Aviation Medicine	
Course Duration		6 months	
Type of Study		Full time (Morning)	
Study System		Semesters system	
Total Credit Hours		Total credit hours of the program: 20 18 Credit hours (Course Work) 02 Credit hours (Research Work)	
Credit Hours Distribution		Credit Hours Distribution Course work & Research Work = 20 Credit hours Semester 1 = 10 Credit hours Semester 2 = 10 Credit hours TOTAL CREDIT HOURS OF THE PROGRAM = 20	
Study Hours Distribution		Study Weeks per Semester = 12 Exam... Preparation per Semester = 1 Week Total Weeks of The Program = 26 Working Days = Daily 9:00am - 3:00pm(Except Sundays)	
Teaching Hours Distribution		Lecture hours = 288 Practical/Self Directed Studies / Foundation Work = 50	
Modules Detail with Credit Hours			
Semester	Modules	Credit Hours	Semester Credit Hours
I	Module I		
	Aviation Medicine-General	01	
I	Module II		
	Aviation Physiology	03	
I	Module III		
	Operational Aviation Medicine	06	
			10 credit hours
Semester	Modules	Credit Hours	Semester Credit Hours
II	Module IV		
	Clinical Aviation Medicine	05	
II	Module V		
	Travel Medicine / Air Ambulance Services	02	



II	Module VI		
	Motivation & leadership	01	
II	Research Work	02	
			10 credit hours
	Total Credit Hours		20 credit hours

Teaching Institution	Aviation Medicine Department, School of Public Health DUHS,
Diploma Awarding Institution and eligibility criteria Course Fees Package,	Dow University of Health Sciences M.B.B.S, one year house job. <u>Rs:60,000</u>
Teaching Faculty	
<ul style="list-style-type: none"> • Dr.G.Kadir Shaikh. Program Director AVN.MED • Dr.Nayyer Husain Naqvi. Director AVN.MED • Dr.Ghulam Nabi Channa. Coordinator / Lecturer AVN.MED • Professor of Physiology • Professor Forensic Medicine • Professor Pathology • Professor Hematology • Professor Anatomy • Professor Cardiology • Professor Ophthalmology • Professor ENT • Professor Endocrinology • Professor Dentistry • Professor Internal Medicine • Professor Neurology • Professor Psychiatry • Professor Psychology • Professor Pulmonology • Professor Gynecology • Professor Orthopedics • Professor Urology • Renowned Visiting Professors 	



MAIN TOPICS OF SYLLABUS FOR DIPLOMA
IN AVIATION MEDICINE

<u>MODULE – I</u>	<u>CREDIT HRS</u>
AVIATION MEDICINE – GENERAL	01
<u>MODULE – II</u>	
AVIATION PHYSIOLOGY (BIOPHYSICS)	03
<u>MODULE – III</u>	
OPERATIONAL AVIATION MEDICINE	06
<u>MODULE – IV</u>	
CLINICAL AVIATION MEDICINE	05
<u>MODULE – V</u>	
TRAVEL MEDICINE / AIR AMBULANCE SERVICE	02
<u>MODULE – VI</u>	
MOTIVATION AND LEADERSHIP	01
<u>RESEARCH WORK / PROJECT</u>	02
<u>TOTAL COURSE CREDIT HRS</u>	20



SYLLABUS AND ALLIED ACTIVITIES

MODULE-I

Contact Hours

AVIATION MEDICINE-GENERAL

1:-FAMILIARIZATION OF AVIATION MEDICINE

04

- History of Aviation Medicine.
- Familiarization of Civil Aviation terminology
- Role of ICAO in Aviation Medicine
- Aviation Definitions

2:-MEDICAL STANDARDS FOR CIVIL FLIGHT CREW

10

- Civil Medical standards
- Type and validity of civil licenses
- Fail safe crew concept
- Assessment of Medical fitness, medical requirements And dispensation
- Responsibilities of Aviation medical examiners
- Responsibilities of Medical Assessor
- Responsibilities of Airline Doctors
- Role of civil Aviation Medical Board(CAMB)
- Deterioration in Medical fitness

3:-MEDICAL STANDARDS FOR MILITARY AVIATORS

04

- Familiarization of Military aviation terminology
- Military Medical standards
- Responsibilities of flight surgeons
- Aircrew Effectiveness program

MODULE -II

AVIATION PHYSIOLOGY (BIO PHYSICS)

04

1:-ATMOSPHERE

- Physics of atmosphere.
- Altitude physiology.
- Gas Laws –physiological significance.
- Cosmic radiations/ozone layer.



2:-PHYSIOLOGY OF THE SYSTEMS

08

- Physiology of Respiratory system.
- Physiology of Cardiovascular system
- Physiology of Blood & Circulation
- Review of Acid Base balance –Blood gas exchange.
- Oxygen saturation & Oxygen Dissociation curve
- Physiology of ENT and EYE
- Demonstrations & Practical Skills

3: - ANATOMY OF THE SYSTEMS

04

- Anatomy of Respiratory system.
- Anatomy of Cardiovascular system
- Anatomy of ENT and EYE

4:-HYPOXIA DEMONSTRATIONS & PRACTICAL SKILLS

04

- Physiological effects-risk of incapacitation.
- Signs and Symptoms.
- Types and Preventive Methods.
- Average Time of Useful Consciousness (TUC).

5:-HYPERVENTILATION

02

- Physiological effects, risk of in capacitation.
- Signs and symptoms.
- Preventive Methods

6:-DECOMPRESSION

02

- Physiological effects of decompression
- Signs and symptoms
- Decompression sickness
- Preventive Methods- Risk of incapacitation
- Hyperbaric therapy Debrief-Demonstration & Practical Skills

7:-RAPID DECOMPRESSION

02

- Signs and Symptoms
- Preventive Methods- Risk of incapacitation



8:-DYSBARISM

02

- Physiological Effects, risk of incapacitation.
- Signs and Symptoms.
- Preventive Methods.

9:-ACCELERATION, DEMONSTRATIONS & PRACTICAL SKILLS

08

- Effects of long duration acceleration.
- Protection against long duration acceleration.
- Short duration acceleration.
- G-vector orientation.
- Effects and limits of G-load.
- Acceleration and vestibular system
- Positive / Negative acceleration
- Methods to increase gz-tolerance

10:-FATIGUE IN AVIATION

04

- Physiological effects and risk of incapacitating.
- Signs and symptoms.
- Types of Fatigue
- Preventive Methods.

11:-LIFE SUPPORT EQUIPMENT, DEMONSTRATIONS & PRACTICAL SKILLS

03

- Oxygen supplies-Oxygen equipment
- Pressure Breathing
- Pressure clothing, Hypobaric chamber-Debrief

12:-AVIATION METROLOGY

03

- Weather & clouds hazards in aviation
- Weather flight plan in Aviation
- Metrological aspects in aviation
- Demonstration & practical skills

13:-THERMAL PHYSIOLOGY

02

- Thermal environment and Human Heat exchange.
- Thermal stress and Management.



14:- NIGHT VISION

02

- Physiological effects, risk of incapacitation.

MODULE-III

OPERATIONAL AVIATION MEDICINE

1:-NOISE

02

- Physiological effects, risk of incapacitation.
- Signs and symptoms. Preventive Methods.

2:-VIBERATION

02

- Physiological effects, risk of incapacitation.
- Signs and symptoms-Preventive Methods.

3:-SPATIAL DISORIENTATION, DEMONSTRATION & PRACTICAL SKILLS

08

Visual Disorientation

- Sloping cloud deck.
- Ground lights and stars confusion.
- Visual auto-kinesis.

Vestibular Disorientation

- Functions of semicircular canals & otolith organs

The Oculogyral and Coriolis Illusion

Leans

Simulator Illusions

- Forward acceleration of nose up.
- Deceleration illusion of nose down

4:-FUNDAMENTALS OF AERODYNAMICS

05

- Military Flying -Aero medical Aspects
- Civil Flying - Aero medical Aspects
- Helicopter Flying - Aero medical Aspects
- Agricultural flying - Aero medical Aspects
- Simulator flying - Aero medical Aspects



<u>5:- ANTHROPOMETRY AND AIRCREW EQUIPMENT INTIGERATION</u>	02
<ul style="list-style-type: none">• Aero medical Aspects	
<u>6:-NAVIGATIONAL AIDS-AEROMEDICAL CONSIDERATION</u>	03
<ul style="list-style-type: none">• Navigational aids & equipment• Air Route calibrations	
<u>7:-ERGONOMICS - AEROMEDICAL CONSIDERATION</u>	02
<u>8:-SURVIVAL –SEARCH AND RESCUE</u>	05
<ul style="list-style-type: none">• Sea survival• Desert survival• Jungle survival• Snow survival	
<u>9:-AIR CRAFT ACCIDENT / INVESTIGATIONS</u>	05
<ul style="list-style-type: none">• Management of crash fatalities.• Analysis of air craft accidents• Preventive measures• Demonstrations & Practical Skills through video films/tutorials	
<u>10:-ERRORS & ACCIDENTS</u>	02
<ul style="list-style-type: none">• Demonstrations & Practical Skills through video films/tutorials	
<u>11:-EJECTION OF SEAT AND EJECTION INJURIES</u>	02
<ul style="list-style-type: none">• Aero medical aspects- Risk of incapacitation	
<u>12:-AIR TRAFIC CONTROLLERS</u>	04
<ul style="list-style-type: none">• Aero medical aspects.• Duty timing and rest schedules• Occupational stress & stress prevention methodology• Runway incursion & flight safety – practical demonstration• Midair Collisions - Prevention	



13:-HUMAN FACTORS & FLYING

04

- Long haul flight operations
- Flight duty time limitations
- Sleep disorders
- Circadian Rhythm / Jet lag / Time Zones
- Flying risk factors and decision making.
- Practical demonstrations through video films

14:- AVIATION PATHOLOGY

05

- Environmental pathology
- Immunopathology
- Molecular pathology
- DNA Evidence of Causalities
- Pattern of injuries in aviation

15:- AIRCRAFT FUELS

02

- Hydrazine, GP fuels
- Lubricants & hydraulic fluids.
- Combustion products and toxic hazards.
- Aero medical aspects

16:-FIRE FIGHTING & FIRE EXTINGUISHERS

02

- Uses and operations- Aero medical aspects
- Mock Exercise Practical -Demonstrations

17:-AVIATION TOXICOLOGY

10

- Forensic Medicine in Aviation
- Management of Crash fatalities
- Causes of Deaths in air craft accidents.
- Evaluation of injuries in air craft accidents.
- Autopsy procedures and collection of specimens
- Identification of dead bodies in aircrafts accidents
- Analysis of aircraft accidents
- Co-poisoning in aviation medicine
- Preventive measures of aircraft accidents
- DNA and forensic evidences



<u>18:-COCKPIT AND CABIN ENVIRONMENT</u>	04
<ul style="list-style-type: none">• Cabin & Cockpit pressurization.• Cabin humidity, cabin air recirculation and dehydration.• Cabin & Cockpit mobility, circulatory problems and DVT.• Smoke, Fire and fire hazards in aircrafts cabins• Management of In-flight Emergencies.	
<u>19:-EMERGENCY EVACUATION OF AIRLINE PASSENGERS</u>	02
<ul style="list-style-type: none">• Mock Exercises• Practical Demonstration & Practical Skills	
<u>20:- AIRCRAFT HYGIENE</u>	02
<ul style="list-style-type: none">• Water Supply, Oxygen Supply and Disposal of waste.• Cleaning, Disinfection and Disinfection of cabin and aircrafts.	
<u>21:-IN-FLIGHT CATERING SERVICES</u>	01
<ul style="list-style-type: none">• Demonstration & Practical Skills	
<u>22:-FLIGHT SAFETY STRATEGIES IN MILITARY AVIATION</u>	02
<ul style="list-style-type: none">• Pressurization of Military Aircrafts	
<u>23:-FLIGHT SAFETY STRATEGIES IN COMMERCIAL AVIATION</u>	02
<ul style="list-style-type: none">• Threat and Error Management• Aero medical aspects	
<u>24:-MEDICATION & FLYING</u>	06
<ul style="list-style-type: none">• Hazards of Medication• Common side effects of prescription medications• Over the counter medications• Herbal & Alternative Medications• Alcohol – Signs & symptoms, preventive methods.• Psychoactive drugs• Substance abuse• Drug dependence & alcoholism	
<u>25:-FEAR AND REFUSAL OF FLYING</u>	02



26:-AIRLINE OCCUPATIONAL HEALTH

02

- Occupational Health hazards in aviation
- Aero Medical Consideration

27:-Crew Resource Management (CRM).

02

- Pilot In-Flight Incapacitation.
- Enhancing flight crew Management of Unexpected Events.

28:- COMMUNICATION SKILLS

03

- Communication skills
- Presentation skills
- Writing skills

29:-AIRPORT EMERGENCY/DISASTER PLAN

03

- Aims & Objectives
- Triage principles
- Evacuation of casualties
- Medical supplies
- Selection of Hospitals/Supplies
- Demonstrations through video films

MODULE IV-CLINICAL AVIATION MEDICINE

1:-OPHTHALMOLOGY, DEMONSTRATION AND PRACTICAL SKILLS

08

- Visual Acuity assessment.
- Visual Fields –Ocular Muscle Balances.
- Color Vision- Methods & Aero Medical Aspects
- Binocular vision, Stereopsis, Monocularity
- Tropias and Phorias- Depth perception
- Glaucoma - Cataracts – Contact Lenses
- Refractive surgery – Aero Medical Aspects
- Common eye injuries-assessment after eye surgery.
- Practical demonstration of visual Aids.



2:- OTORHINOLARYNGOLOGY, DEMONSTRATION AND PRACTICAL SKILLS

EAR

06

- Diseases of External ear, Middle ear and Inner ear
- Vertigo –effects and preventive measures.
- Hearing standards – Hearing aids
- Menieres disease – labyrinthitis
- Functional hearing tests, Audiometry, Speech Discrimination
- Deafness and Acoustic Trauma.

NOSE

03

- Common Diseases of Nose.
- Diseases of the Nasal passages and Sinuses
- Allergic rhinitis- Barosinusitis

PHARYNX & LARYNX

02

- Diseases of pharynx and larynx.
- Tracheostomy-Aeromedical consideration

3:-MOTION SICKNESS

02

- Signs and Symptoms
- Preventive Methods

4:-AVIATION CARDIOLOGY, DEMONSTRATION AND PRACTICAL SKILLS

09

- Examination procedures including ECG, Thallium, ECHO, HOLTERS.
- Diseases of CVS...Hypertension-treatment and assessment.
- Ischemic Heart Diseases.
- Satisfactory recovery from MI, interventional procedures.
- Cardiomyopathies and assessment.
- Rhythm and conduction disorders.
- Common congenital heart diseases.
- Valvular Heart Diseases
- Cardiac Medications

5:-REPIRATORY SYSTEM, DEMONSTRATION AND PRACTICAL SKILLS

05

- Chronic Obstructive Pulmonary Diseases(COPD)
- Bronchial Asthma / Signs and Symptoms / risk of incapacitation
- Pneumothorax / Spontaneous Pneumothorax
- Pulmonary Blebs and Bullae
- Pulmonary Tuberculosis
- Treatment and assessment of Pulmonary Diseases



6:-DIGSTIVE SYSTEM, DEMONSTERATION AND PRACTICAL SKILLS 04

- Acid – Peptic Diseases
- Inflammatory Bowel Diseases.
- Hepatic disorders (Acute / Chronic Hepatitis)
- Assessment after post abdominal surgeries.

7:-ENDOCRINE DISORDERS 03

- Diabetes Mellitus-diagnostic criteria, investigations, Treatment and operational assessment
- Hyper/hypothyroidism-treatment and assessment.
- Pituitary and Adrenal glands disorders-treatment and assessment.

8:-HEAMATOLOGY, DEMONSTERATION AND PRACTICAL SKILLS 04

- Blood donation – Aero medical aspects
- Polycythemias, Anemia's, Leukemia's, Lymphomas etc.
- Platelet disorders –assessment and treatment.
- Haemoglobinopathies-Treatment and assessment.
- Varicose veins and Deep Venous Thrombosis

9:-URINARY SYSTEM, DEMONSTERATION AND PRACTICAL SKILLS 03

- Urinary system disorders.
- Obstructive uropathies.
- Treatment and assessment.

10:-GYNAECOLOGY AND OBSTETRICS 02

- Gynecological issues in aviation.
- Pregnancy and aviation.
- Relation to aviation and risk of incapacitation.

11:-ORTHOPEDIC DISORDERS, DEMONSTERATION AND PRACTICAL SKILLS 04

- Musculoskeletal disorders.
- Arthropathies and Radiculopathies.
- Replacement of joints- Prosthesis
- Assessment and treatment.



12:- AVIATION NEUROLOGY

10

- Neurological disorders-assessment and risk of incapacitation.
- Seizures-assessment of single episode.
- Epilepsy-assessment and risk of incapacitation.
- Head trauma, post-traumatic states.
- Disturbance of consciousness –single and repeated episodes.
- Infections of Nervous system.
- Traumatic Brain injury.
- Hereditary, Degenerative, and Demyelinating disorders.
- Cerebrovascular disorders.
- Syncope and Episodic disorders.
- Treatment and assessment.

13:- AVIATION PSYCHIATRY

06

- Relation to aviation- risk of incapacitation.
- Psychiatric –disorders-Neurosis, Psychosis
- Personality and Behavior Disorders- risk of incapacitation.
- Anxiety and Mood disorders.
- Organic Mental disorders.
- Treatment and assessment

14:-AVIATION PSYCHOLOGY

05

- Introduction of Aviation Psychology.
- Methods of Examinations.
- Behavior and Personality traits, Psychological stress, stress coping and fatigue.
- Psychomotor Functions and age.
- Assessment and psychotherapy.

15:-AVIATION DENTISTRY

04

- Dental Hygiene.
- Common Dental condition.
- Barodontalgia, Dental Prosthesis-assessment and management.



MODULE V- TRAVEL MEDICINE & AIR AMBULANCE SERVICES

1:-AIR AMBULANCE SERVICES

04

- Aero medical Transfer of Critically ill Patients
- Aero medical evacuation of sick passenger - Selection of casualties
- Inflight Medical Emergencies

2:- TRAVEL MEDICINE

06

- Introduction to travel medicine
- Care and safety of Air Line passengers
- Fitness of airline passengers for flights
- Protection of health of crew and passengers
- Communicable diseases and International air travel
- Telemedicine

3:-INTERNATIONAL HEALTH REGULATIONS

02

- Aero Medical Considerations

4:-FIRST AID BASIC LIFE SUPPORT

06

- Contents of first aid box, AED, aero stretchers, oxygen supplies
- Emergency Medical kits / Supplies
- Demonstrations & practical Skills

5:-AVIATION LEGISLATIONS-RULES & REGULATIONS

12

- ICAO medical standards & recommended practices
- Evidence based Regulations
- Regulations for low Medical Category pilots
- 1% Rule in aviation medicine
- Age – 65 Rule in aviation medicine
- Flexibility / wavier clause in aviation medicine
- Procedure of application of wavier in Aviation Medicine
- Medical conditions and Certification- Aero medical aspects
- Medical assessment through Medical Flight Test
- Confidentiality of Medical Documents
- Mandatory Denial of Licences

6:-Fasting and Flying

02



MODULE VI-MOTIVATION & LEADERSHIP

1:-MOTIVATION & LEADERSHIP 03

- Concept of Motivation
- Motivation & Safety
- Work leadership through Motivation
- Qualities of Good Leadership

2:-CREW DIET & NUTRITION 02

- Dietary concepts in Aviation
- Sources of major Vitamins
- Dietary restrictions to flight crew
- Effects of diet on Crew memory

3:-LEARNING, MEMORY AND INTELLIGENCE 01

4:-RESEARCH CONCEPT & DECISION MAKING 02

5;-PRINCIPLES OF EPIDEMIOLOGY 02

6;-INTRODUCTION OF BIOSTATISTICS 02

7:-FUTURE AVIATION 01

8:-WOULD YOU FLY WITH THIS PILOT? 04

- Case Presentations-Aero medical dispositions
- Fitness for Flying

9:- ASSIGNMENTS AND PRESENTATIONS

10:-PRACTICAL DEMONSTRATIONS BY

PRACTICAL DEMONSTRATIONS BY VISITING

AVIATION RELATED FACILITES

(SUBJECT TO SECURITY CLEARANCE)

RESEARCH WORK/PROJECT

02 Credit Hours (Two Weeks)

FINAL EXAMINATION



01:-PRACTICAL DEMONSTRATIONS BY VISITING AVIATION RELATED FACILITES

- PAF. Museum – Aero Medical Aspects
- ATC Tower CAA – Aero Medical Aspects
- Radar Station CAA – Aero Medical Aspects
- Aircraft Simulators PIAC – Aero Medical Aspects
- Training Center PIAC– Aero Medical Aspects
- Aviation Meteorology – Aero Medical Aspects
- Suparco – Aero Medical Aspects