DOW UNIVERSITY OF HEALTH SCIENCES

POST GRADUATE COURSE FOR DIPLOMA 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 preexisting 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 21\textsuperscript{st} 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 mythology 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 OPPORTUNITIES

- 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

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Diploma in Aviation Medicine</th>
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<tbody>
<tr>
<td>Course Duration</td>
<td>6 months</td>
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<tr>
<td>Type of Study</td>
<td>Full time (Morning)</td>
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<tr>
<td>Study System</td>
<td>Semesters system</td>
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<tr>
<td>Total Credit Hours</td>
<td>Total credit hours of the program: 24 Credit hours (Course Work) 3 Credit hours (Research Work)</td>
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<tr>
<td>Credit Hours Distribution</td>
<td>Course work &amp; Research Work (24 Credit hours) Semester 1 = 12 Credit hours Semester 2 = 12 Credit hours TOTAL CREDIT HOURS OF THE PROGRAM = 24</td>
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<tr>
<td>Study Hours Distribution</td>
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<tr>
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<td>Lecture hours 327 Practical / Self Directed Studies = 25+Foundation work</td>
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## Modules Detail with Credit Hours

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**Teaching Institution**

Aviation Department, School of Public Health
| Diploma Awarding Institution and eligibility criteria | Dow University of Health Sciences  
M.B.B.S, one year house job. |
| Course Fees | Rs:100,000 |
| Teaching Faculty |  
- Dr.G.Kadir Shaikh  
- Dr.Nayyer Hussain Naqvi  
- Dr.Ghulam Nabi Channa  
- Professor of Physiology  
- Professor Forensic Medicine  
- Professor Pathology  
- Professor Community medicine  
- Professor Anatomy  
- Professor Cardiology  
- Professor Ophthalmology  
- Professor ENT  
- Professor Endocrinology  
- Professor Dentistry  
- Professor Internal Medicine  
- Professor Neurology  
- Professor Psychiatry  
- Professor Psychology  
- Professor Surgery  
- Visiting Professors  
- Guest Speakers |
# MAIN TOPICS OF SYLLABUS FOR DIPLOMA IN AVIATION MEDICINE

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<thead>
<tr>
<th>MODULE – I</th>
<th>CREDIT HRS</th>
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<td>AVIATION PHYSIOLOGY (BIOPHYSICS)</td>
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**TOTAL COURSE CREDIT HRS** 24
SYLLABUS AND ALLIED ACTIVITIES

MODULE-I

AVIATION MEDICINE-GENERAL

1: FAMILIARIZATION OF AVIATION MEDICINE 6

- History of Aviation Medicine.
- Responsibilities of Aviation medical examiners
- Responsibilities of flight surgeons
- Familiarization of Civil Aviation terminology/ICAO annexures
- Familiarization of Military aviation terminology

2: MEDICAL STANDARDS FOR CIVIL FLIGHT CREW/MILITARY AVIATORS 10

- Civil medical standards.
- Military medical standards.
- Type and validity of licenses.
- Waivers and flexibility clauses.
- Fail safe crew concept
- Fitness & performance

MODULE -II

AVIATION PHYSIOLOGY (BIO PHYSICS)

1: ATMOSPHERE 10

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

2: RESPIRATORY & CARDIAC PHYSIOLOGY 4

- Physiology of respiratory system.
- Physiology of Cardio Vascular system
- Pressure breathing, oxygen saturation
- Demonstrations & Practical Skills
3: HYPOXIA-INCLUDING DEMOSTRATIONS & PRACTICAL SKILLS

- Physiological effects, risk of in capacitation.
- Signs and symptoms.
- Types and preventive methods.
- Average time of useful consciousness (TUC).

4: HYPERVENTILATION

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

5: DECOMPRESSION

- Physiological effects
- Decompression sickness
- Rapid decompression-signs and symptoms
- Hyperbaric therapy-Demonstration & Practical Skills

6: DYSBARISM

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

7: ACCELERATION-INCLUDING DEMONSTRATIONS & PRACTICAL SKILLS

- 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

8: FATIGUE IN AVIATION

- Physiological effects and risk of in capacitating.
- Signs and symptoms.
- Preventive methods.
9: LIFE SUPPORT EQUIPMENT—INCLUDING DEMONSTRATIONS & PRACTICAL SKILLS

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

10: METROLOGICAL ASPECTS IN AVIATION MEDICINE

11: THERMAL PHYSIOLOGY

- Thermal environment and human heat exchange.
- Thermal stress and management.

12: AERODYNAMICS

- Fundamentals of aerodynamics
- Controls and displays
- Practical demonstration

MODULE-III

OPERATIONAL AVIATION MEDICINE

1: NOISE AND VIBRATION

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

2: SPATIAL DISORIENTATION—INCLUDING DEMONSTRATION & PRACTICAL SKILLS

Visual disorientation

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

Vestibular dis orientation

- Anatomy of inner ear.
- Functions of semicircular canals.
- The oculogyric coriolis illusion (leans)
Simulator illusions

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

3:: MOTION SICKNESS

- Causes, prevention and management.

4:: HELICOPTER OPERATIONS

5:: ANTHROPOMETRY AND AIRCREW EQUIPMENT INTEGRATION

6:: SURVIVAL – SEARCH AND RESCUE

- Sea survival
- Desert survival
- Jungle survival
- Snow survival

7:: AIR CRAFT ACCIDENT / INVESTIGATIONS

- Management of crash fatalities.
- Identification of dead bodies.
- Analysis of air craft accidents
- Preventive measures
- Demonstrations & Practical Skills through video films/tutorials

8:: AIR TRAFFIC CONTROLLERS

- Aero medical aspects.
- Human factor errors.
- Duty timing and rest schedules
- Practical demonstrations through video films

9:: AVIATION TOXICOLOGY

- Introduction.
- Combustion products and toxic hazards.
- Fuel, lubricants hydraulic fluids.
- Fire extinguishers- users and operations.
10: AVIATION PATHOLOGY

- The crash pack.
- Causes of deaths in aircraft accidents.
- Evaluation of injuries in aircraft accidents.
- Autopsy procedures and collection of specimens.
- DNA and forensic evidences
- Demonstration through video films

11: COCKPIT AND CABIN ENVIRONMENT – AIR CRAFT HYGIENE

- Cabin pressurization.
- Cabin humidity, cabin air recirculation and dehydration.
- Cabin mobility, circulatory problems and DVT.
- Hazardous materials in cabin
- Evacuation of passengers.
- Water supply, oxygen supply and disposal of waste.
- Cleaning, disinfection and disinfection of cabin and aircrafts.
- Catering services
- Demonstration & Practical Skills

12: FLIGHT SAFETY STRATEGIES IN MILITARY & COMMERCIAL AVIATION

- Fear and refusal of flying.
- Flight time limitations and rest schedules of flight crew.
- Prevention of midair collisions.

13: MEDICATION & FLYING

- Hazards of Medication
- Common side effects of prescription medications
- Over the counter medications
- Herbal & Alternative Medications

14: AIRLINE OCCUPATIONAL HEALTH

- Occupational Health hazards
- Care of passengers
- Care of flight crew, flight dispatchers, cabin attendants & other aviation related personal
- Crew resource management (CRM).
- Circadian rhythm and jet lag.
- Human factors /ergonomics.
- Flight deck and cockpit integration.
• In-flight incapacitation
• Sleep disorders.
• Occupational stress & stress prevention methodology


17. AGRICULTURAL FLYING-AEROMEDICAL ASPECTS 2

18. NAVIGATIONAL AIDS-AEROMEDICAL CONSIDERATION 2
• Navigational aids & equipment
• Air Route calibrations

19. COMMUNICATION SKILLS 2
• Communication skills
• Presentation skills

20. AIRPORT EMERGENCY/DISASTER PLAN 8
• Aims & Objectives
• Triage principles
• Evacuation of casualties
• Selection of Hospitals/supplies
• Demonstrations through video films

MODULE IV-CLINICAL AVIATION MEDICINE

1. OPHTALMOLOGY –INCLUDING DEMONSTRATION AND PRACTICAL SKILLS 10
• Anatomy and physiology of eye.
• Eye examination techniques.
• Visual acuity assessment.
• Visual aids.
• Visual fields –ocular muscle balances.
• Color vision.
• Binocular vision, stereopsis, monocularity and depth perception
• Common eye injuries-assessment after eye surgery.
• Practical demonstration of visual aids.
2:- OTORHINOLARYNGOLOGY –INCLUDING DEMONSTRATION AND PRACTICAL SKILLS

EAR
- Anatomy and physiology of ear
- Diseases of external ear, middle ear and inner ear
- Anatomy and physiology of vestibular system.
- Vertigo –effects and preventive measures.
- Hearing standards
- Functional hearing tests, audiometry, speech discrimination, deafness and acoustic trauma.

NOSE
- Anatomy and physiology of nose.
- Common diseases of nose.
- Assessment after nasal surgeries.

PHARYNX & LARYNX
- Diseases of pharynx and larynx.
- Tracheostomy-aeromedical consideration

3:- AVIATION CARDIOLOGY –INCLUDING DEMONSTRATION AND PRACTICAL SKILLS

- Examination procedures including ECG, thallium, ECHO, HOLTERS.
- Diseases of CVS...Hypertension-treatment and assessment.
- Ischemic heart diseases.
- Satisfactory recovery from MI, interventional procedure surgeries.
- Cardiomyopathies and assessment.
- Rhythm and conduction disorders.
- Syncope-causes and assessment.

4:- REPIRATORY SYSTEM-INCLUDING DEMONSTERATION AND PRACTICAL SKILLS

- Examination procedures-spirometer, peak flow assessment, x-rays, CT Scans etc.
- Pulmonary diseases.
- Treatment and assessment of pulmonary diseases.

5:- DIGSTIVE SYSTEM-INCLUDING DEMONSTRATION AND PRACTICAL SKILLS

- Relation to aviation and risk of incapacitation.
- Biliary tract disorders –treatment and assessment.
- Inflammatory bowel diseases.
- Assessment after post abdominal surgeries.
6: ENDOCRINE DISORDERS

- Diabetes mellitus—diagnostic criteria, investigations, treatment and operational assessment.
- Hyper/hypothyroidism—treatment and assessment.
- Pituitary and adrenal glands disorders—treatment and assessment.

7: HEAMATOLOGY-INCLUDING DEMONSTRATION AND PRACTICAL SKILLS

- Blood donation aspects.
- Polycythemia, anemia’s, leukemia’s, lymphomas etc.
- Haemoglobinopathies—treatment and assessment.

8: URINARY SYSTEM-INCLUDING DEMONSTRATION AND PRACTICAL SKILLS

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

9: GYNAECOLOGY AND OBSTETRICS

- Pregnancy and aviation.
- Relation to aviation and risk of incapacitation.

10: ORTHOPEDIC DISORDERS-INCLUDING DEMONSTRATION AND PRACTICAL SKILLS

- Musculoskeletal disorders.
- Arthropathies, arthrophosis and radiculopathies.
- Replacement of joints.
- Assessment and treatment.

11: MALIGNANT DISORDERS

- Risk of incapacitation—wavier decisions.

12: AVIATION NEUROLOGY

- Examination procedures.
- Neurological disorders—assessment and risk of incapacitation.
- Seizures—assessment of single episode.
- Epilepsy—assessment and risk of incapacitation.
- Head trauma, posttraumatic states.
- Disturbance of consciousness—single and repeated episodes.
- Treatment and assessment.
13:- AVIATION PSYCHIATRY

- Relation to aviation- risk of incapacitation.
- Psychiatric –disorders-neurosis, psychosis, organic mental disorders.
- Personality disorders- risk of incapacitation.
- Drugs, alcohol and substance abuse-treatment, assessment and rehabilitation.

14:-AVIATION PSYCHOLOGY

- Introduction of aviation psychology.
- Methods of examinations.
- Behavior and personality traits, psychological stress, stress coping and fatigue.
- Assessment and psychotherapy.
- Psychomotor functions and age.
- Mental illness training.
- Errors and accidents.

15:-AVIATION DENTISTRY

- Dental hygiene.
- Common dental condition.
- Barodontalgia, dental prosthesis-assessment and management.

16:-AVIATION SURGERY

- Shock
- Hemorrhoids
- Burns
- Backache

17:-DIET & NUTRITION

- Dietary concepts in aviation
- Sources of major vitamins
- Dietary restrictions to flight crew

MODULE- V

AVIATION LEGISLATION & AIR AMBULANCE SERVICES

1. AIR AMBULANCE SERVICES

- Aero Medical Considerations
- Selection of casualties
- Emergency care of multiple injuries/Sickness
- Telemedicine
2: FIRST AID INCLUDING BASIC LIFE SUPPORT

- Contents of first aid box, AED, aero stretchers, oxygen supplies
- Demonstrations & practical Skills

3: LEGISLATIONS-RULES & REGULATIONS

- ICAO medical standards & recommended practices
- Evidence based regulations
- Accredited medical conclusion
- Regulations for low medical category pilots
- Protection of crew/passengers from communicable diseases
- International Health regulations
- Medical assessment through medical flight test

MODULE VI - MOTIVATION & LEADERSHIP

1: MOTIVATION & LEADERSHIP

- Concept of Motivation
- Motivation & Safety
- Work leadership through motivation

2: LEARNING, MEMORY AND INTELLIGENCE

3: Principals of Epidemiology

4: Introduction to Biostatistics

5: RESEARCH CONCEPT & DECISION MAKING

6: FUTURE AVIATION

7: 1% RULE

8: WILL YOU FLY WITH THIS PILOT

- Case presentations-Aero medical dispositions

RESEARCH WORK/PROJECT

COURSE CRITIQUE & DEBRIEFING

FINAL EXAMINATION
PRACTICAL DEMONSTRATIONS BY VISITING VARIOUS AVIATION RELATED FACILITIES

- PAF Museum
- ATC Tower CAA
- Radar Station CAA
- Aircraft Simulators PIAC
- Training Center PIAC
- Maintenance Hanger PIAC
- Aviation Meteorology