EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

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Common Core Content and Training Objectives for Basic AIS Training (Phase 1 Ab Initio)

HUM.ET1.ST05.2000-GUI-01

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Abstract

The creation of a set of Common Core Content and Training Objectives for the training of ab initio AIS personnel will assist in the harmonisation of operational practices in the Aeronautical Information Services.

Keywords

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EXECUTIVE SUMMARY

The ECAC Strategy for the 90s [Ref. 1] called for the definition of “Guidelines for the selection, training and licensing of Air Traffic Services Staff in the ECAC Member States”.

EATCHIP, through the Human Resources Team (HRT) and its Training Sub-Group (TSG), established an AIS Training Task Force (AIS-TF) to design a set of Common Core Contents (CCC), including Training Objectives and Syllabi for Aeronautical Information Services personnel training from entry to full operational status. The EATCHIP AIS Team, through its Planning and Operations Sub-Group (AISPOP), have been kept fully informed about the activities and results related to the development of guidelines for AIS training.

It should be noted that the Common Core Content and Training Objectives to this guideline are designed in such a way as to be usable either by a training centre which is just beginning to become involved in basic AIS training, or by more developed centres as supporting documentation which complements their own course content. This guideline of Common Core Content for basic AIS training can be administered at a training centre as a single course, or in modules which can be administered over a longer period of time at an operational training unit.

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1. INTRODUCTION

1.1 Background

The AIS-TF was established as part of the EATCHIP response to the recommendations made as part of the ECAC strategy for the 90s [Ref. 1]. Objective 5 of that strategy states:

> *"Define Guidelines for the selection, training and licensing of Air Traffic Services Staff in the ECAC Member States".*

The document also states:

> *"Training Syllabuses and Programmes should be harmonised by identification and definition of a common core of items directly following from job descriptions. In addition, this would enable national facilities such as training schools and simulators to be used more flexibly.*
>
> *Adoption of well defined and appropriate guidelines for training of all staff, and licensing of Air Traffic Controllers, should lead to a more harmonised level of performance in control centres throughout the ECAC area".*

The EATCHIP Human Resources Domain (HUM) established a Specialist Task (ST05) to deal with the matter of Air Traffic Services (ATS) Training. The Human Resources Team (HRT) delegated responsibility for control of the relevant TFs to its own Training Sub-Group (TSG) and the AIS-TF was established in July 1996.

1.2 Scope

According to the Human Resources Domain Plan [Ref. 2], the EATCHIP Specialist Task 05 (Specification of Training) states:

> *Establish sets of standard training objectives and syllabi for ATS jobs*. These sets will define an agreed Common Core Content for training ATCOs within the ECAC area. Establish guidance material to facilitate the addition of individual state's complementary training.*

These guidelines are a pre-requisite within the Conversion and Implementation Programme [Ref. 3] of EATCHIP.

*Note: Specialist Task Deliverable (DEL03) refers to "Guidelines for CCC and Training Objectives for AIS staff training".

1.3 Methodology

The first meeting of the AIS-TF was held in July 1996 at IANS, Luxembourg. There were 7 participants present representing 5 ECAC States and EUROCONTROL (IANS). Two more States joined the task force at its second meeting (see Annex C: List of AIS Training Task Force Members).

The objective of the AIS-TF was to develop standard CCCs, training objectives and syllabi for AIS training from entry to full operational status. The work has been linked closely to the proposals made for the AIS Staff Profile (AIS Team Specialist Task AIS.ET1.ST04).

The Terms of Reference (TOR) of the AIS-TF stated that:

> *"Within the content of the Human Resources Business Plan (3.0) and the scope of its assigned Specialist Task ST05.2000 (Institutional Training for AIS and ATFM Staff), the AIS-TF shall, in close co-ordination with the HRT (and the AIS Team), develop Common Training Syllabi, taking account of common operating procedures, in order to assist States in their training programmes of AIS personnel for:*
>
> *Basic Training:*
>
> *Ab initio courses - Phase 1*
>
> *Specialist courses for ARO, NOF and Publications - Phase 2.*
>
> *Upgrade Training*
>
> *Special advanced qualifications for experienced staff.*

The priority task is to be the development of guidelines for Basic AIS Training (HUM.ET1.ST05.2000-DEL03). Phase 1 training is seen as common to all AIS students whereas in Phase 2 students could follow one or more of the modules depending on national, or local, requirements.

To achieve the work programme the AIS-TF:

- examined current Course Content in States;
- selected subject matter considered as necessary for AIS training taking into account current ICAO Guidelines;
- drafted a set syllabus for each subject so identified;
- detailed a set of training objectives for each subject;
- considered any additional training material deemed appropriate;

- made recommendations to and sought guidance from the HRT's TSG and the AIS Team's AISPOP as appropriate.

The AIS-TF effectively continued the work started by AISAP's Common Training Group (CTG) which had outlined a modular approach. Additionally, the AIS-TF took note of the work done by the CCCTF (ATC training) and adopted a similar approach and layout in defining topics, training objectives and content. Because of the different needs of the Aeronautical Information Services not all subjects are common to both ATC and AIS, nor do they require the same emphasis.

The AIS-TF agreed to start work on the Phase 1 "Ab initio Training Course" which was defined as "*Training designed to impart fundamental knowledge and skills to enable AIS students to progress to specialised operational AIS Training*".

The topics covered in this guideline, being similar to those identified by the CCCTF are:

- Air Law (including rules of the air, national and international regulations and organisational structures);
- Principles of Air Traffic Services;
- Aerodromes;
- The Aeronautical Information Service;
- Meteorology;
- Navigation;
- Principles of Flight and Aircraft Characteristics;
- Human Performance and Limitations;
- Equipment (including modern systems and computers in general);
- Miscellaneous.

Details on the topic, objective and content will found on chapter 2: STRUCTURE OF GUIDELINE / Common Core Content, pages 11 to 57.

The first task was to divide the topics into sub-topics and decide which subjects should be taught within these areas. Training Objectives were modified to suit the requirements of AIS training.

Four different levels, or grades, were allocated to the Training Objectives:

- Level 0: "to be aware of",
- Level 1: "to know",

- Level 2: “to understand”,
- Level 3: “to practice” (skill development)

A list of action verbs was written and an appropriate verb was chosen depending on the grading allocated to each objective.

The full list is attached at page 11 in the chapter 2.1: Summary of Verbs Used.

When teaching to the Training Objectives, it is envisaged that different training methodologies will be used. Many subjects can be adequately taught in a classroom environment, whilst others require some form of practical methodology, for example using a Personal Computer (PC) based simulation.

It was not in the Terms of Reference for this TF to produce training plans, merely the Training Objectives and Syllabus and therefore no recommendations have been made in this area.

These Guidelines are laid out in columns. The 1st column shows the “Topic” breakdown, the 2nd shows an “Objective” which will lead to the “General Objective” and the 3rd column gives a broad “Content”. In some cases there is no corresponding entry in the “Content” column as the “Objective” is deemed to be self explanatory.

English Language: The AIS-TF recognises the need for AIS Personnel to communicate with the users of the service in English (specifically in ATS Reporting Offices) and to comprehend written English (NOTAM office and Publications). There are no guidelines published at this time on the selection requirements, including those for English language, for AIS Personnel. The level of English among potential AIS recruits in the ECAC States varies considerably. The Task Force has not therefore addressed the matter of English language requirements in this Guideline document on Common Core Content.

1.4 Future Work

Phase 2 of basic AIS training will produce similar guidelines for the functions of International NOTAM Office (NOF), Publications and Air Traffic Services Reporting Office (ARO). These guidelines will be produced as one document allowing Training Personnel and Course Designers the opportunity to prepare modules most suited to the organisation of their Aeronautical Information Services.

2. STRUCTURE OF GUIDELINE / COMMON CORE CONTENT

1. Summary of Verbs used

2. Introduction

1. Course Management;
2. Introduction to AIS Training Courses;
3. Introduction to Career Prospects for AIS Personnel;
4. Conditions of Service;
5. Security.

3. Air Law

1. Introduction;
2. International Organisations;
3. National Organisations;
4. Rules and Regulations.

4. Principles of Air Traffic Services

1. Air Traffic Management;
2. Radio-Telephony;
3. ATC Clearances & Instructions;
4. Co-ordination;
5. Altimetry and Level allocation;
6. Separation Standards;
7. Collision Avoidance;
8. Data Display;
9. Air Traffic Flow Management.

5. Aerodromes

1. Aerodrome Layout;
2. Aerodrome Marking and Lighting Systems.

6. The Aeronautical Information Services

1. Principles of the Aeronautical Information Service;
2. Organisation of AIS;
3. Responsibilities and Functions of AIS;
4. Flight Plans;
5. Integrated Aeronautical Information Package;
6. Flight Crew Information;
7. AIS Developments.

7. Meteorology

1. Introduction;
2. Atmosphere;
3. Atmospheric Processes;
4. Meteorological Phenomena;
5. Meteorological Information.

8. Navigation

1. Introduction
2. The Earth;
3. Maps and Aeronautical Charts;
4. Applied Navigation;
5. Radio Navigation.

9. Principles of Flight and Aircraft Characteristics

1. Principles of Flight;
2. Aircraft Engines;
3. Aircraft Instruments;
4. Aircraft Types and Categories;
5. Factors Affecting Aircraft Performance;
6. Aircraft data.

10. Principles of Flight and Aircraft Characteristics

1. Psychological Factors;
2. Medical and Physiological factors;
3. Social and Organisational Factors;

4. Learning;
5. Stress and Human Errors.

11. Equipment

1. General;
2. Radio;
3. Other Voice Communication Systems;
4. Radar;
5. Automatic Dependent Surveillance;
6. Future Equipment;
7. Computerisation;
8. Automation in ATS;
9. Working Positions.

12. Miscellaneous

1. Study Visits;
2. Airspace Users;
3. Customer Relations;
4. Environmental Protection.

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2.1 Summary of Verbs Used

To BE AWARE OF	To KNOW	To UNDERSTAND	To APPLY
Level 0	Level 1	Level 2	Level 3
BE AWARE OF FAMILIARISE	DEFINE DRAW IDENTIFY LIST NAME RECALL RECOGNISE SPECIFY STATE	APPRECIATE CHARACTERISE DESCRIBE DIFFERENTIATE EXPLAIN	CHOOSE ENCODE/DECODE ESTIMATE USE

Level 0 Essentially “nice to know” material which will aid the student’s overall understanding of a subject.

Level 1 Requires a basic knowledge of the subject. It is the ability to remember essential points; the trainee is expected to memorise data and to recall it.

Level 2 Requires an understanding of the subject sufficient to enable the student to discuss intelligently. The individual is able to represent for himself or herself certain objects and events and to act upon these objects and events.

The verb “to appreciate” means that the student is able to state the plan but not required to apply it. In a given situation the student will say that co-ordination should be done and with whom (the student appreciates the necessity for co-ordination). In a practical situation (i.e. Level 3) the student will co-ordinate, - that is, he/she will apply the techniques and procedures learnt (derived from Brien and Eastmond 1992/1994).

Level 3 Requires a thorough knowledge of the subject and the ability to apply it with accuracy. The student should be able to make use of his/her repertoire of knowledge and understanding in order to develop plans and activate them.

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2.2 Introduction

The general objectives for Introduction are to:
(i) provide students with knowledge and understanding of the training programme that they will follow and their future career in AIS;
(ii) define, for the students, aspects of security which will impact on their career within AIS.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	L	**CONTENT**
1. COURSE MANAGEMENT			
1.1. *Course Introduction*	1.1.1. identify the basic course, the aims and main objectives of the course	**1**	Course objectives
1.2. *Course Administration*	1.2.1. name the course leader and teachers/instructors	**1**	
1.3. *Study Material*	1.3.1. choose and integrate appropriate documentation into course studies.	**3**	Library and CBT library
2. INTRODUCTION TO THE AIS TRAINING COURSE			
2.1. *Course Content*	2.1.1. state the different methods of teaching the subjects	**1**	Theoretical lessons, practical simulations, group work, self study, CBT and course visits
	2.1.2. describe the different subjects of the course	**2**	
2.2. *Training Progress*	2.2.1. identify the feedback mechanisms available	**1**	Instructor discussions, training progress, assessment results
	2.2.2. describe the positive influence there is in working	**2**	How the influence of interactive studies can lead to success
2.3. *The Assessment Process*	2.3.1. describe the assessment procedure.	**2**	Written, oral and practical assessments, pass marks, re-sit procedures

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
3. INTRODUCTION TO CAREER PROSPECTS FOR AIS PERSONNEL			
3.1. *Career Prospects*	3.1.1. identify the working environment of AIS personnel	**1**	ARO, NOTAM Office, AIP and Chart production and publication
	3.1.2. identify future career developments.	**1**	OJT Instructor, Supervisor, operational managerial posts, non-operational posts
4. CONDITIONS OF SERVICE			
4.1. *Current Conditions of Employment*	4.1.1. identify administrative Employment Rules and Regulations which apply to AIS personnel	**1**	
	4.1.2. explain the training and qualification of AIS Personnel	**2**	Approved training courses, Qualifying Authority
4.2. *Future Negotiations and Policies*	4.2.1. identify the management/staff negotiation and discussion procedures	**1**	
	4.2.2. identify the role of trade unions and other professional organisations.	**1**	
5. SECURITY			
5.1. Security	5.1.1. define security and safety	**1**	
	5.1.2. state the rules and regulations concerning the security at an airport and within the Aeronautical Information Service.	**1**	

2.3 Air Law

The general objectives for Air Law are to:
(i) enable students to appreciate the basic principles of Air Law;
(ii) enable students to apply the Regulations governing Rules of the Air, Airspace and Flight Planning;
(iii) ensure that students understand the authority vested in AIS personnel and the means by which that authority is exercised.

TOPIC / SUBTOPIC	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
1. INTRODUCTION			
1.1. *National and International Organisations*	1.1.1. state the necessity for Air Law	**1**	
	1.1.2. name the key National & International aviation organisations	**1**	ICAO, ECAC, EU, JAA, EUROCONTROL, National Authority
	1.1.3. describe the impact these organisations have on Air Traffic Operations and their interaction with each other.	**2**	
2. INTERNATIONAL ORGANISATIONS			
2.1. *ICAO*	2.1.1. explain the purpose and function of ICAO	**2**	
	2.1.2. describe the methods by which ICAO notifies and implements legislation	**2**	SARPS, PANS, SUPPS Annexes, Documents, ICAO Regional Offices
2.2. *Other Agencies*	2.2.1. describe the purpose and function of other international agencies and their relevance to Air Traffic Operations	**2**	ECAC, EU, JAA, EUROCONTROL

TOPIC / SUBTOPIC	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
2.3. *International Aviation Associations*	2.3.1. describe the purpose of international controller, pilot, airline operator and airspace user associations and their inter-relation with Air Traffic Operations.	**2**	IFATCA, IFALPA, IATA, IAOPA, IACA
3. NATIONAL ORGANISATIONS			
3.1. *General*	3.1.1. describe the purpose and function of appropriate national Agencies and their relevance to Air Traffic Operations	**2**	Civil Aviation Administration Agencies, Government Agencies, Military Air Traffic Services
3.2. *National Legislative Procedures*	3.2.1. describe the methods by which legislation is implemented and notified	**2**	NOTAM, AIPs, AICs, National procedures
3.3. *National Regulatory Body*	3.3.1. name the body responsible for ensuring that legislation and operational procedures are enforced	**1**	
	3.3.2. describe how the body carries out its safety regulation responsibilities	**2**	
3.4. *National Aviation Associations*	3.4.1. describe the purpose of national controller, pilot, airline operator and airspace user associations and their inter-relation with Air Traffic Operations.	**2**	

TOPIC / SUBTOPIC	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
4. RULES AND REGULATIONS			
4.1. *General*	4.1.1. list the types of Air Navigation Services	**1**	ATM (ATS, ATFM, ASM),AIS, MET, COM, SAR
	4.1.2. state the objectives of the Air Traffic Services	**1**	ICAO Annex 11, Chap.2.2
	4.1.3. list the types of Air Traffic Services	**1**	ATC, Advisory, FIS, Alerting
4.2. *Airspace*	4.2.1. explain airspace classification	**2**	Classes A-G and National application
	4.2.2. differentiate between the different types of airspace	**2**	Such as:- Control Zones, Control Areas, Airways, Upper & Lower Airspace, FIR
4.3. *Rules of the Air*	4.3.1. explain the International Rules of the Air	**2**	ICAO Annex 2, Chapters 2, 3, 4, 5
	4.3.2. explain any notified national differences with ICAO	**2**	National legislation
	4.3.3. be aware of the influence of relevant general flight rules on ATC	**0**	ICAO Annex 2, Chap.3
	4.3.4. differentiate between flying in accordance with visual and instrument flight rules (VFR and IFR).	**2**	ICAO Annex 2, Chapters 4 and 5

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2.4 Principles of Air Traffic Services

The general objectives for the Principles of Air Traffic Services are:
(i) to enable students to appreciate the basic operational procedures that are used in the provision of Air Traffic Control to aircraft;
(ii) to ensure that students are aware of the necessity for ATC to apply these procedures to ensure a safe and expeditious service to airspace users.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
1. AIR TRAFFIC MANAGEMENT			
1.1. *Air Traffic Control Service*	1.1.1. define “ATC Service”	**1**	ICAO Annex 11 Chap.1
	1.1.2. explain specific areas of responsibility of ATC Services	**2**	ICAO Annex 11: Area Control, Approach Control, Aerodrome Control
	1.1.3. be aware of different types of Control Services	**0**	Radar, Non-radar
1.2. *Flight Information Service*	1.2.1. define “Flight Information Service”	**1**	ICAO Annex 11, Chap.1
	1.2.2. state the information that shall be passed to aircraft by a Controller	**1**	ICAO Annex 11, Chap.4
	1.2.3. state the methods of transmitting information	**1**	R/T, Data link
	1.2.4. recognise when, and what information, ATC should pass to a pilot concerning the location of other conflicting air traffic.	**1**	Traffic information, Essential traffic information
1.3. *Alerting Service*	1.3.1. define “Alerting Service”	**1**	ICAO Annex 11, Chap.1

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
	1.3.2. describe the phases of emergency	**2**	ICAO Annex 11, Chap.5
	1.3.3. describe the organisation, responsibilities and structure of Rescue Co-ordination Centres	**2**	National RCC
1.4. *Air Traffic Flow Management (ATFM)*	1.4.1. describe the purpose and function of ATFM	**2**	Flow Management, Free Flight
1.5. *Airspace Management (ASM)*	1.5.1. describe the purpose and function of ASM.	**2**	Flexible use of airspace (FUA)
2. RADIO-TELEPHONY			
2.1. *General Operating Procedures*	2.1.1. use Phonetic Alphabet, Numerals, expression of time	**3**	ICAO Annex 10, Vol. 2, Chap.5
	2.1.2. use correct speech technique.	**3**	Transmission techniques, Standard Words & Phrases as contained in ICAO Annex 10, Vol. 2, Chap.5
3. ATC CLEARANCES & INSTRUCTIONS			
3.1. *Type & Content of ATC Clearances*	3.1.1. define “ATC Clearance”	**1**	ICAO Annex 2, Chap.1
	3.1.2. explain the contents of an ATC clearance	**2**	ICAO Doc 4444
3.2. *ATC Instructions*	3.2.1. define “ATC Instructions”	**1**	ICAO Doc 4444
	3.2.2. explain the contents of an ATC Instruction.	**2**	

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
4. CO-ORDINATION			
4.1. *Principles*	4.1.1. explain the principles of co-ordination	**2**	Negotiation, notification, agreement as contained in ICAO Annex 11 and Doc 4444
4.2. *Necessity*	4.2.1. explain the necessity of co-ordination	**2**	Safe conduct of flight
4.3. *Methods*	4.3.1. state methods of co-ordination.	**1**	Data link, Telephone, Intercom, Voice, Transfer of Flight Data, Local agreements
5. ALTIMETRY & LEVEL ALLOCATION			
5.1. *Altimetry*	5.1.1. explain the relation- ship between level, height and altitude	**2**	QNH, QFE, Standard Pressure Setting
5.2. *Transition Level*	5.2.1. define “transition level”, “transition altitude” and “transition layer”	**1**	ICAO Doc 8168
5.3. *Level allocation*	5.3.1. state the semi-circular rules	**1**	
	5.3.2. describe the effects of transition level changes on the allocation of flight levels	**2**	
	5.3.3. explain the factors that determine lowest useable flight level.	**2**	
6. SEPARATION STANDARDS			
6.1. *Vertical Separation*	6.1.1. state the vertical separations standards	**1**	Separation Standards as per ICAO DOC 4444; RNAV
	6.1.2. explain the use of vertical separation	**2**	Flight Level Allocation, Use of Mode C derived information

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
6.2. *Horizontal Separation*	6.2.1. describe the use of longitudinal separation based on time & distance	**2**	ICAO DOC 4444; RNAV
	6.2.2. describe the use of lateral separation	**2**	ICAO DOC 4444
6.3. *Radar Separation*	6.3.1. state the general radar separations	**1**	
6.4. *Wake Turbulence Separation*	6.4.1. describe the influence of wake turbulence on separation.	**2**	
7. COLLISION AVOIDANCE			
7.1. *Airborne*	7.1.1. explain the available airborne collision avoidance systems	**2**	ACAS, TCAS
7.2. *Ground*	7.2.1. explain the available ground based collision avoidance systems.	**2**	MTCA, STCA
8. DATA DISPLAY			
8.1. *Data Extraction*	8.1.1. explain the purpose of the controller's flight progress display	**1**	Flight Progress Strips, Electronic Data
	8.1.2. list the pertinent data to be extracted from a flight plan to produce a flight progress display	**1**	
	8.1.3. state the pertinent data from other sources to produce a flight progress display	**1**	Pilot Reports, Controller Co-ordination, Data Exchange

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
8.2. *Data Management*	8.2.1. describe how a controller updates the data display to accurately reflect the traffic situation.	**2**	Strip display update procedures
9. AIR TRAFFIC FLOW MANAGEMENT			
9.1. *Introduction*	9.1.1. define "air traffic flow management"	**1**	ICAO Doc 4444, Part 1
	9.1.2. explain the objectives of the ATFM service	**2**	CFMU Handbook
	9.1.3. identify the area of responsibility	**1**	
	9.1.4. list exemptions	**1**	Types of flights excluded from ATFM measures
9.2. *Organisation*	9.2.1. draw the operational structure of the CFMU	**1**	FDO, CEU - operational divisions
	9.2.2. describe the structure of Flight Data Operations Division	**2**	IFPS, STRAT, ENV and ARC - systems and functions
	9.2.3. describe the structure of the Central Executive Unit (CEU)	**2**	TACT/CASA system, FMPs and AO Liaison Cell

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
9.3. *ATFM Activities*	9.3.1. identify the phases of ATFM activities	**1**	Strategic, pre-tactical and tactical
	9.3.2. explain the strategic phase	**2**	Period of action, tasks and TOS, Off-Load Routes
	9.3.3. explain the pre-tactical phase	**2**	Period of action, tasks (calculation of rates, post tactical analysis), ANM, AIM
	9.3.4. explain the tactical phase.	**2**	Period of action, tasks, re-routing, slot allocation procedures and messages

2.5 Aerodromes

The general objectives for Aerodromes are to:
(i) familiarise students with the layout of an aerodrome;
(ii) enable students to explain the purpose of aerodrome marking and lighting systems.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
1. AERODROME LAYOUT			
1.1. *Aerodrome*	1.1.1. define “aerodrome”	**1**	ICAO Annex 14, Chapter 1 Definitions
	1.1.2. differentiate aerodrome areas	**2**	ICAO Annex 14 movement and manoeuvring areas
1.2. *Manoeuvring Area*	1.2.1. identify the parts of the manoeuvring area	**1**	Runways and taxiways
	1.2.2. list the elements of a runway	**1**	Threshold, end, TDZ etc.
1.3. *Apron*	1.3.1. define “apron”	**1**	ICAO Annex 14, Chap.1
	1.3.2. list the elements of an apron.	**1**	Apron taxiway, aircraft stand taxilane, aircraft stand
2. AERODROME MARKING AND LIGHTING SYSTEMS			
2.1. *Visual Aids for Approach and Landing*	2.1.1. explain the purpose of aerodrome marking and lighting systems	**2**	Visual guidance to pilots, ICAO Annex 14, Chap.5
	2.1.2. describe runway markings	**2**	RWY designation, centre line, threshold, fixed distance, TDZ
	2.1.3. describe taxiway markings	**2**	Centre line, taxi holding position and taxiway intersection

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
Visual Aids for Approach and Landing (continued)	2.1.4. describe runway lighting	**2**	Runway threshold identification, edge, end, centre line, touchdown zone and SWY
	2.1.5. describe taxiway lighting	**2**	Centre line, edge lights and stop bars
	2.1.6. describe Visual Approach Slope Indicator Systems	**2**	T-VASIS, A-VASIS, PAPI and APAPI
	2.1.7. describe approach lighting systems	**2**	Simple, precision and Category I,II and III systems
	2.1.8. describe the signal area	**2**	ICAO Annex 14, Chap.5
	2.1.9. describe the wind direction indicator	**2**	ICAO Annex 14, Chap.5
	2.1.10. describe how obstructions are identified.	**2**	ICAO Annex 14, Chap.6

2.6 The Aeronautical Information Service

The general objectives for the Aeronautical Information Service are:
(i) to enable students to appreciate how AIS functions;
(ii) to enable students to explain how information is collected and disseminated.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
1. PRINCIPLES OF THE AERONAUTICAL INFORMATION SERVICE			
1.1. *Purpose of AIS*	1.1.1. recognise the need for AIS	**1**	ICAO Doc 8126, Chap.1
	1.1.2. identify the need for uniformity	**1**	
1.2. *Scope of information handled by AIS*	1.2.1. identify the size and scope of information handled by AIS	**1**	ICAO Doc 8126, Chap.1
	1.2.2. differentiate permanent information, temporary information and information of an explanatory, advisory or administrative nature.	**2**	
2. ORGANISATION OF AIS			
2.1. *Status of AIS*	2.1.1. describe the status of AIS within the aviation administration	**2**	ICAO Doc 8126, Chap.2
2.2. *AIS Organisation*	2.2.1. describe the organisation of the Aeronautical Information Service	**2**	ICAO Doc 8126, Chap.2
	2.2.2. explain the liaison with other related services	**2**	
	2.2.3. illustrate the information flow within AIS.	**2**	

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
3. RESPONSIBILITIES AND FUNCTIONS OF AIS			
3.1. *Responsibilities and Functions*	3.1.1. specify the responsibilities of a contracting state	**1**	ICAO Annex 15, Chap.3
	3.1.2. describe the functions of AIS	**2**	
3.2. *Adequacy and Authenticity*	3.2.1. appreciate the need for the adequacy of information to be disseminated	**2**	ICAO Annex 15, Chap.3
	3.2.2. appreciate the need for the authenticity of information to be disseminated	**2**	
3.3. *Origin of Information*	3.3.1. state the originators of raw information	**1**	ICAO Doc 8126, Chap.1
	3.3.2. list the different types of raw information	**1**	
3.4. *Exchange of Information*	3.4.1. describe the exchange of aeronautical information with other services or States	**2**	ICAO Annex 15, Chap.3
	3.4.2. describe the different telecommunications networks used for the exchange of information	**2**	AFTN, SITA, CIDIN

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
3.5. *Dissemination of Information*	3.5.1. describe the means by which aeronautical information is disseminated	**2**	NOTAM, AIP, AIC, AIRAC, SUPPS
	3.5.2. recognise the information disseminated through the AFTN.	**1**	Aircraft movement messages, NOTAM
4. FLIGHT PLANS			
4.1 *Introduction*	4.1.1. define “flight plan”	**1**	ICAO Annex 2, Chap.1
	4.1.2. differentiate the types of flight plans	**2**	FPL, AFIL and RPL
4.2. *Filed Flight Plan*	4.2.1. list the items contained in a flight plan	**1**	Items and their denomination
	4.2.2. differentiate the three parts of a flight plan form	**2**	Section COM, ATS data and supplementary information
	4.2.3. encode and decode the flight plan form	**3**	ICAO Doc 4444
	4.2.4. recognise AFTN format (including supplementary information)	**1**	Composition of FPL message
	4.2.5. describe the conditions under which a flight plan shall be submitted	**2**	ICAO Annex 2, Chap.3.3. FPL affected by IFPS. National differences
	4.2.6. state the times when a flight plan has to be submitted	**1**	ICAO Annex 2, Chap.3.3. FPL affected by IFPS. National differences

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
	4.2.7. explain the procedure for the submission of a flight plan	**2**	ICAO Doc 4444, Part ii. para 8.2.
4.3. *ATS Messages*	4.3.1. list the categories of ATS messages	**1**	Emergency, movement/control and flight information messages
	4.3.2. list flight plan associated messages	**1**	ICAO Doc 4444, Part viii
4.4. *Integrated Initial Flight Plan Processing System (IFPS)*	4.4.1. describe organisation and function of IFPS	**2**	CFMU Handbook
	4.4.2. list air traffic affected by IFPS	**1**	IFR, GAT and mixed flights (IFR/VFR, GAT/OAT)
	4.4.3. recognise ADEXP format	**1**	The structure of ADEXP format
	4.4.4. identify operational reply messages (ORM)	**1**	ACK, MAN and REJ
	4.4.5. state the function of ORM.	**1**	CFMU Handbook
5. INTEGRATED AERONAUTICAL INFORMATION PACKAGE			
5.1. *Integrated Aeronautical Information Package.*	5.1.1. explain the need for the Integrated Aeronautical Information Package	**2**	Collect, collate, edit and publish aeronautical information
	5.1.2. list the principle users of the Integrated Aeronautical Information Package	**1**	Flight operations personnel, ATS units

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
	5.1.3. list the contents of the Integrated Aeronautical Information Package	**1**	ICAO Annex 15, Chap.2, AIP, AIP amendments and AIP supplements, NOTAM, PIB, AIC, checklists and summaries
	5.1.4. state responsible authority for the publication and distribution of the Integrated Aeronautical Information Package	**1**	Aviation administration of a State or the delegated authority
	5.1.5. describe the methods of distribution of the items of the Integrated Aeronautical Information Package	**2**	Distribution list, mailing, fax, AFTN, electronic means
5.2. *Aeronautical Information Publication - AIP*	5.2.1. explain the purpose of the AIP	**2**	Essential information of a lasting character, permanent information and temporary changes of long duration
	5.2.2. explain the structure of the AIP	**2**	General, En-route and Aerodromes
	5.2.3. list the basic contents of Part 1 General (GEN)	**1**	National regulations and requirements, tables and codes, services, charges
	5.2.4. list the basic contents of Part 2 En-route (ENR)	**1**	General rules and procedures, airspace classification, ATS routes, radio navigation aids/systems, navigation warnings, en-route charts

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
	5.2.5. list the basic contents of Part 3 Aerodromes (AD)	**1**	Aerodromes, heliports, charts
	5.2.6. explain how an AIP is updated	**2**	AIP amendments, AIRAC, AIP supplements, NOTAM
5.3. *AIP Amendments*	5.3.1. explain the purpose of the AIP Amendment	**2**	Permanent changes
	5.3.2. describe how AIP Amendments are produced	**2**	Specifications, format, colour coding
5.4. *AIP Supplements*	5.4.1. explain the purpose of the AIP Supplement	**2**	Temporary changes of long duration, information of short duration with extensive text/graphics
	5.4.2. describe how AIP Supplements are produced	**2**	Specifications, format, colour coding
5.5. *NOTAM*	5.5.1. explain the purpose of NOTAM	**2**	ICAO Annex 15, Chap.5.1
	5.5.2. list the information contained in a NOTAM	**1**	ICAO Annex 15, Chap.5.1 incl. operation of aerodromes, hazards which affect air navigation
	5.5.3. describe NOTAM format	**2**	ICAO Annex 15, Appendix 6; ICAO Doc 8126
	5.5.4. list special series NOTAM	**1**	SNOWTAM ASHTAM (BIRDTAM, FLOWTAM,)
5.6. *Preflight Information Bulletin (PIB)*	5.6.1. explain the purpose of PIB	**2**	ICAO Doc 8126, Chap.5.6
	5.6.2. state the sources of information in a PIB	**1**	NOTAM, MET

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
	5.6.3. recognise the scope of a PIB	**1**	Area to be covered
	5.6.4. describe the contents of a PIB	**2**	Navigation warnings, general information, date and time of issue
	5.6.5. list the bulletin types	**1**	Area, route, aerodrome, urgent operational significance
	5.6.6. identify the structure of the PIB output	**1**	Heading, en-route and aerodrome information, navigation warnings
5.7. *Aeronautical Information Circular (AIC)*	5.7.1. explain the purpose of the Aeronautical Information Circular	**2**	ICAO Annex 15, Chap.7
	5.7.1. list information appropriate to an AIC	**1**	ICAO Annex 15, Chap.7
5.8. *Checklists and Summaries*	5.8.1. explain the purpose of Checklists	**2**	ICAO Doc 8126
	5.8.2. explain the purpose of Summaries.	**2**	ICAO Doc 8126
6. FLIGHT CREW INFORMATION			
6.1. *Obligation for Pre-Flight Briefing*	6.1.1. be aware of the responsibility of pilots to obtain pre-flight briefing	**0**	ICAO Annex 2
6.2. *Physical location of an Air Traffic Services Reporting Office (ARO)*	6.2.1. state the requirements for the physical location of an ARO	**1**	ICAO Doc 8126, Chap.5.2

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
6.3. *Coverage Zone and detailed information to be held*	6.3.1. differentiate the coverage zone of an ARO	**2**	ICAO Doc 8126, Chap.5.3
	6.3.2. list the detailed information to be held	**1**	ICAO Doc 8126, Chap. 5.4
6.4. *Preflight Information*	6.4.1. be familiar with crew procedures for flight preparation	**0**	Aircraft and equipment serviceability, fuel, passenger and cargo manifest, AIS and MET briefing
6.5. *Briefing Methods*	6.5.1. state sources of information for pre-flight briefing	**1**	ICAO Annex 15, Chap.8.1
	6.5.2. list methods of briefing	**1**	Personal, telephone, fax, self-briefing
6.6. *Postflight Information*	6.6.1. state the purpose of postflight information.	**1**	ICAO Doc 8126, Chap.5.9 ICAO Annex 15, Chap.8.2
7. AIS DEVELOPMENTS			
7.1. *Integrated Automated AIS System*	7.1.1. explain the principles of an automated AIS system	**2**	ICAO Doc 8126, Chap.8
	7.1.2. describe the configuration of an automated AIS system	**2**	
7.2. *European AIS Database (EAD)*	7.2.1. state the advantages of the EAD	**1**	
	7.2.2. explain the data flow between the EAD and national automated AIS Computer-Aided AIS services	**2**	Exchange of data in SDO, INO and ECI

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
7.3. *Electronic AIP*	7.3.1. state the use of an electronic AIP	**1**	Ease of distribution, use in the cockpit
7.4 *Harmonised access to AIS/MET information*	7.4.1. describe the principle of harmonising access to AIS/MET information	**2**	Access time, use of satellite data bases including MET charts, AIS data bases
	7.4.2. state the use of MET information in a combined PIB	**1**	TAF, METAR, SIGMET, upper wind charts
7.5. *AIS developments in the future*	7.5.1. be aware of future developments in AIS	**0**	e.g. Internet access for flight planning and PIB, information on status of GPS via NOTAM, Integrated Aeronautical Information Service
	7.5.2. be aware of the impact of Quality Assurance systems.	**0**	Quality Assured Aeronautical Information Systems, ISO 9000

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2.7 Meteorology

The general objectives for Meteorology are to:
(i) provide students with knowledge and understanding of the basic theory of meteorology;
(ii) give students an appreciation of how this affects airline operations and aircraft performance.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
1. **INTRODUCTION**			
1.1. *Aviation and Meteorology*	1.1.1. explain the relevance of meteorology in aviation	**2**	
1.2. *Organisation of Meteorological Services*	1.2.1. name the basic duties, organisation and working methods of met offices	**1**	
	1.2.2. state the international and national standards for the exchange of meteorological data	**1**	
	1.2.3. identify methods of collection and recovery of meteorological data.	**1**	Barometer, thermometer, ceilometer, anemometer, weather balloons, transmissometer, radar, satellites
2. ATMOSPHERE			
2.1. *Composition and Structure*	2.1.1. state the composition and structure of the atmosphere	**1**	Gases, layers
2.2. *Standard Atmosphere*	2.2.1. describe the elements of the International Standard Atmosphere (ISA)	**2**	Temperature, pressure, density
	2.2.2. state the reasons why the ISA has been defined	**1**	

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
2.3. *Air Masses and Global Air Circulation*	2.3.1. describe the origin and general location of different characteristic types of air masses	**2**	Polar, Maritime, Equatorial,
	2.3.2. state the major wind systems on the earth	**1**	Polar east winds, westwind zone, trade winds, inner-tropical convergence zone, land/sea breezes, mountain/valley breeze, local systems
2.4. *Frontal Systems*	2.4.1. describe the high and low pressure systems	**2**	
	2.4.2. differentiate between various fronts and weather associated with them.	**2**	Fronts: warm, cold, occluded; squalls
3. ATMOSPHERIC PROCESSES			
3.1. *Heat and Temperature*	3.1.1. identify the processes by which heat is transferred and how the atmosphere is heated	**1**	Radiation, convection, advection
	3.1.2. describe how temperature varies	**2**	Lapse rates, land/sea variations
3.2. *Water in the Atmosphere*	3.2.1. differentiate between the different terms relating to air saturation levels	**2**	Saturation, condensation, evaporation, relative humidity, dew point, sublimation and latent heat
3.3. *Air Pressure*	3.3.1. describe the relationship between pressure, temperature and height	**2**	

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
	3.3.2. explain the measurement of air pressure	**2**	Barometer, hPa
	3.3.3. explain the relationship between Pressure Datums. (compare with Principles of ATS, objective 5.1.1.)	**2**	QFE, QNH, Standard Pressure Setting
4. METEOROLOGICAL PHENOMENA			
4.1. *Clouds*	4.1.1. state the different conditions necessary for the formation of clouds	**1**	
	4.1.2. explain how clouds are formed	**2**	
	4.1.3. identify different cloud types and state their characteristics	**1**	Stratus, Cumulus, etc.
	4.1.4. state how the amount of cloud is measured	**1**	
4.2. *Precipitation*	4.2.1. explain the significance of precipitation in aviation	**2**	
	4.2.2. describe all types of precipitation	**2**	Falling rain, snow, sleet, hail

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
4.3. Visibility	4.3.1. explain the causes of atmospheric obscurity	**2**	Advection fog, radiation fog, mixing, evaporation, mist, drizzle
	4.3.2. state methods of measuring visibility	**1**	
	4.3.3. explain “Runway Visual Range - RVR”	**2**	
4.4. *Wind*	4.4.1. explain the significance of wind phenomena and types	**2**	Veering, backing, gusting, jetstreams, land/sea breezes, Föhn, surface wind, upper winds
	4.4.2. state how wind is measured	**1**	Anemometer
4.5. *Meteorological Hazards*	4.5.1. describe the hazards to flight of significant meteorological phenomena, their origins and operational effect.	**2**	Turbulence, thunderstorms, icing, windshear and microbursts
5. METEOROLOGICAL INFORMATION			
5.1. *Meteorlogical Messages and Reports*	5.1.2. explain the content of weather reports and forecasts	**2**	METAR, SPECI, TAF, SIGMET
5.2. *Meteorological Maps*	5.2.1. decode information from the most commonly used weather charts.	**3**	Isobars, Low level charts, High level charts, Low level significant weather charts

2.8 Navigation

The general objectives for Navigation are to:
(I) provide students with knowledge and understanding of the basic principles of navigation and air navigation systems;
(ii) enable students to identify the various maps and charts used in AIS.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall ..*	**L**	**CONTENT**
1. INTRODUCTION			
1.1. *Purpose and use of Navigation*	1.1.1. explain the need for navigation in aviation and have an overview of the methods used.	**2**	History, celestial, on-board, radio, satellite
2. THE EARTH			
2.1. *Place and Movement of the Earth*	2.1.1. explain the Earth's properties and its effects	**2**	Form, size, rotation, revolution in space, seasons, day, night, twilight, units of time measurement
2.2. *System of Co-ordinates, Direction and Distance*	2.2.1. describe how a position on the Earth's surface is determined	**2**	Latitude and longitude
	2.2.2. explain direction and distance on a globe	**2**	Great circle, small circle, rhumb line
	2.2.3. describe how distance and direction between two points are determined	**2**	
	2.2.4. characterise the general principles of WGS-84 (World Geodetic System, 1984)	**2**	WGS-84
2.3. *Magnetism*	2.3.1. explain general principles of magnetism	**2**	True, magnetic, variation, deviation, inclination
	2.3.2. differentiate between the 3 north datums.	**2**	True, magnetic, compass

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall ..*	**L**	**CONTENT**
3. MAPS AND AERONAUTICAL CHARTS			
3.1. *Map Making and Projections*	3.1.1. describe how the earth is projected as a map	**2**	Principle of projection
	3.1.2. describe the properties of an ideal map	**2**	Scale, distance, topography, accuracy
	3.1.3. explain the properties and uses of different projections	**2**	Conformal Lambert, Mercator
3.2. *Map Symbols*	3.2.1. identify symbols and information found on maps and charts	**1**	ICAO Annex 4, Appendix 2
3.3. *Charts used by ATS (AIS in particular)*	3.3.1. differentiate between the various relevant charts and state their specific use.	**2**	AIP charts, national and military charts
4. APPLIED NAVIGATION			
4.1. *Measurement*	4.1.1. explain the measurement of the distance between two points	**2**	Circular slide rule, navigation computer
4.2. *Influence of Wind*	4.2.1. explain the influence of wind on the flight path	**2**	Heading, track, drift, wind vector
4.3. *Speed*	4.3.1. explain the relationship between various speeds.	**2**	True airspeed, Indicated airspeed and Ground speed
5. RADIO NAVIGATION			
5.1. *Pilot Interpreted Ground Based Systems*	5.1.1. describe the use, precision and limitations of ground based systems	**2**	NDB, VOR, DVOR, (TACAN), DME, ILS & marker beacons
	5.1.2. explain the working principles of ground based systems	**2**	NDB, VOR, DVOR, TACAN, DME, ILS and marker beacons
	5.1.3. describe the instrument displays in the cockpit of ground based systems	**2**	NDB (ADF), VOR, TACAN, DME, ILS and marker beacons

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall ..*	**L**	**CONTENT**
	5.1.4. state the working principles of MLS-based and VLF-based systems	**1**	MLS, VLF
5.2. *On Board Systems*	5.2.1. explain the working principles and use of on-board systems	**2**	INS, FMS and navigational computers (area navigation)
5.3. *Satellite Based Systems*	5.3.1. explain the working principles and use of satellite based navigational systems.	**2**	GPS, GLONASS, GNSS

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2.9 Principles of Flight and Aircraft Characteristics

The general objective for Principles of Flight and Aircraft Characteristics is to provide students with knowledge of the:
(I) basic principles of the theory of flight, and
(II) aircraft characteristics.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
1. PRINCIPLES OF FLIGHT			
1.1. *Forces acting on aircraft*	1.1.1. describe the forces acting on an aircraft in flight	**2**	Lift, thrust, drag, weight
	1.1.2. list factors affecting these forces	**1**	Streamline flow, airfoil, angle of attack
1.2. *Structural components and control of an aircraft*	1.2.1. list the main structural components of an aircraft	**1**	Wings, tailplane, fuselage, flaps, ailerons, elevator, rudder
	1.2.2. describe how the control surfaces influence the movements of an aircraft	**2**	Rudder, aileron, elevator, throttle
1.3. *Flight Envelope*	1.3.1. identify the critical factors which affect aircraft performance.	**1**	Maximum speeds, stall speeds, ceiling, streamline flow, turbulent flow
2. AIRCRAFT ENGINES			
2.1. *Piston Engines*	2.1.1. explain the operating principles, advantages and disadvantages of the piston engine and propeller	**2**	Piston engines, fixed pitch, variable pitch, number of blades
2.2. *Jet Engines*	2.2.1. explain the operating principles, advantages and disadvantages of the jet engine	**2**	

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
	2.2.2. list the different types of jet engines	**1**	Turbo, fan, afterburner
2.3. *Turboprop Engine*	2.3.1. explain the operating principles, advantages and disadvantages of the turboprop engine and propeller.	**2**	
3. AIRCRAFT INSTRUMENTS			
3.1. *Flight Instruments*	3.1.1. explain basic operating principles of cockpit Instruments	**2**	Altimeter, air speed indicator, vertical speed indicator, turn and bank indicator, artificial horizon, gyro compass
3.2. *Navigational Instruments*	3.2.1. refer to Navigation, objective 5.1.3. (Radio Navigation)		To include: NDB (ADF), VOR (TACAN), DME ILS
3.3. *Engine Instruments*	3.3.1. be familiar with vital engine monitoring parameters and their associated instruments	**0**	Oil pressure and temperature, engine temperature, rpm, fuel state and flow, etc.
3.4. *Additional Instruments*	3.4.1. be familiar with the use of other cockpit instruments.	**0**	e.g. TCAS, SSR Transponder, Head up Display, GPWS, Wind Shear Indicator, Weather Radar, Autopilot, FMS, EFIS
4. AIRCRAFT TYPES AND CATEGORIES			
4.1. *Aircraft Types*	4.1.1. list the different categories of aircraft	**1**	Fixed wing, rotary wing, balloons, gliders, etc.
4.2. *Wake Turbulence Categories*	4.2.1. state the correct wake turbulence category.	**1**	ICAO categories, national categories

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
5. FACTORS AFFECTING AIRCRAFT PERFORMANCE			
5.1. *Take off*	5.1.1. be familiar with the factors affecting aircraft on take off	**0**	Runway conditions; wind, temperature and aircraft weight
5.2. *Climb*	5.2.1. be familiar with the factors affecting aircraft during climb	**0**	Speed, weight ,altitude, wind and temperature
5.3. *Cruise*	5.3.1. be familiar with the factors affecting an aircraft at cruise	**0**	Altitude, cruising speed, wind and effect of weight and air density on ceiling.
5.4. *Descent and Initial Approach*	5.4.1. be familiar with the factors affecting an aircraft during descent	**0**	Wind, speed, rate of descent, aircraft configuration and pressurisation
5.5. *Final Approach and Landing*	5.5.1. be familiar with the factors affecting an aircraft during final approach and landing descent	**0**	Wind, aircraft configuration, weight, meteorological and runway conditions
5.6. *Ecological Factors*	5.6.1. be familiar with performance restrictions due to ecological constraints.	**0**	Fuel dumping, noise abatement procedures,
6. AIRCRAFT DATA			
6.1. *Recognition*	6.1.1. identify the most common types of aircraft in operational use	**1**	
6.2. *Performance Data*	6.2.1. state the ICAO aircraft type designators and categories	**1**	ICAO Doc 8643

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2.10 Human Performance and Limitations

The general objective for Human Performance and Limitations is to:
(I) provide students with knowledge and understanding of factors which affect personal, and
(ii) increase the team performance.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
1. PSYCHOLOGICAL FACTORS			
1.1. *Behavioural*	1.1.1. state the role of motivation in human performance	**1**	Extrinsic and intrinsic reinforcement
1.2. *Cognitive*	1.2.1. describe the principles of human information processing	**2**	Attention, perception, memory and cognition in AIS work
1.3. *Personality*	1.3.1. differentiate between psychological states and personality traits.	**2**	
2. MEDICAL AND PHYSIOLOGICAL FACTORS			
2.1. *Fatigue*	2.1.2. be aware of the influence of fatigue on human performance	**0**	Disturbance of sleep, heavy workload
2.2. *Alcohol & drugs*	2.2.1. explain the influence of alcohol and drugs on human performance	**2**	Central nervous system, autonomous nervous system, medication
2.3. *Fitness*	2.3.1. be aware of the importance of physical and mental fitness	**0**	Physical and mental fitness
2.4. *Work environment*	2.4.1. be aware of physical and physiological factors affecting the work environment.	**0**	Work environment, Ergonomics

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
3. SOCIAL AND ORGANISATIONAL FACTORS			
3.1. *Human Relations*	3.1.1. state factors involved in human relations	**1**	Person perception
	3.1.2. state the factors of work satisfaction	**1**	
3.2. *Interpersonal Skills*	3.2.1. describe communications and interpersonal skills	**2**	One-way and two-way communication
3.3. *Group Dynamics*	3.3.1. be aware of the basic principles of interrelations affecting a group of people	**0**	Group dynamics
	3.3.2. be aware of basic reasons for conflicts and their solutions.	**0**	Balance between actual status and desired status internal and external triggers, rules of the game
4. LEARNING			
4.1. *Learning*	4.1.1. describe the principles of learning	**2**	Learning strategies, learning techniques declarative knowledge, skills
4.2. *Feedback*	4.2.1. describe the characteristics of correct feedback	**2**	Feedback
4.3. *Objectives*	4.3.1. recognise the connection between training objectives, training devices and practice leading to a successful completion of training.	**1**	Training objectives, training devices and practice

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall...*	**L**	**CONTENT**
5. STRESS AND HUMAN ERRORS			
5.1. *Stress*	5.1.1. be aware of the effect of stress upon performance	**0**	Stress performance curve, 3 elements of stress, workload
5.2. *Stress management*	5.2.1. be aware of the principles of stress management	**0**	
	5.2.2. be aware of the general process of assimilation of shocking and stressful events.	**0**	

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2.11 Equipment

The general objectives for Equipment are to:
(I) provide students with knowledge and understanding of the basic working principles of equipment that is used in ATC and AIS;
(ii) enable students to use computers so as to complete CBT programmes and to handle electronic data displays.

TOPIC / *SUBTOPIC*	**OBJECTIVES** Students shall ..	**L**	**CONTENT**
1. GENERAL			
1.1. *ATS Equipment*	1.1.1. characterise various items of ATS equipment.	**2**	Voice Communication Systems, Radios, VDF/UDF, Radars, etc.
2. RADIO			
2.1. *Radio Theory*	2.1.1. state the principles of radio	**1**	
	2.1.2. recognise the characteristics of radio waves	**1**	Propagation limitations
	2.1.3. state the use, characteristics and limitations of frequency bands	**1**	- Use in ATC, navigation and communications. - Use and application in the Aeronautical Mobile Service. - VHF and HF
2.2. *Radio Communications*	2.2.1. state the use of radio in ATC	**1**	
	2.2.2. describe the basic principles of a transmitting and receiving system	**2**	
	2.2.3. identify on a basic block diagram the components of the transmitter/receiver system	**1**	
2.3. *Direction Finding*	2.3.1. state the principles of VDF/UDF	**1**	VDF/UDF, QDM, QDR, QTE, etc.

TOPIC / *SUBTOPIC*	**OBJECTIVES** Students shall ..	**L**	**CONTENT**
3. OTHER VOICE COMMUNICATION SYSTEMS			
3.1. *ATS Communications*	3.1.1. state the use of other voice communication systems in ATS	**1**	Telephone, interphone, intercom
3.2. *Airline Communications*	3.2.1. state the use of SELCAL.	**1**	
4. RADAR			
4.1. *General*	4.1.1. state the principles of radar	**1**	
	4.1.2. recognise the characteristics of radar wavelengths	**1**	
	4.1.3. identify the use, characteristics and limitations of different radar installations and their use	**1**	Frequency bands, long and short range radar, weather radar, high resolution radar
4.2. *Primary Radar*	4.2.1. explain the basic principle of Primary Surveillance Radar	**2**	PSR
4.3. *Secondary Radar*	4.3.1. explain the basic principles of Secondary Surveillance Radar	**2**	SSR - Mode A, Mode C
4.4. *Use of Radars*	4.4.1. list the use of PSR/SSR in ATC	**1**	Area, approach and surface movement radars, DFTI
	4.4.2. describe the link between PSR/SSR with automated Systems	**2**	
	4.4.3. list the advantages and disadvantages of PSR/SSR	**1**	
4.5. *Mode S*	4.5.1. state the principles of Mode S	**1**	
	4.5.2. list the use of Mode S	**1**	
4.6. *Precision Approach Radars*	4.6.1. state the use of Precision Approach Radar.	**1**	PAR/GCA

TOPIC / *SUBTOPIC*	**OBJECTIVES** Students shall ..	**L**	**CONTENT**
5. AUTOMATIC DEPENDENT SURVEILLANCE			
5.1. *Automatic Dependent Surveillance (ADS)*	5.1.1. state the basic principles of ADS	**1**	Satellites, data links, GPS
	5.1.2. be aware of the use and limitations of ADS.	**0**	Update times, no voice prompts
6. FUTURE EQUIPMENT			
6.1. *Developments*	6.1.1. be aware of known developments in the equipment field.	**0**	Equipment to be introduced beyond training period (e.g. speech recognition)
7. COMPUTERISATION			
7.1. *Computer*	7.1.1. state the principles of the computer	**1**	
	7.1.2. explain the working principles of a computer	**2**	
	7.1.3. describe the way information is compiled, processed and distributed	**2**	
7.2. *Computer Systems*	7.2.1. state the difference between hardware and software	**1**	
	7.2.2. identify the hardware components	**1**	e.g. Terminal, printer keyboard, monitor, modem, network
	7.2.3. identify the software components	**1**	e.g. Programmes & applications, operating systems, files
7.3. *Utilisation*	7.3.1. describe operating systems in general use	**2**	DOS, MS-WINDOWS
	7.3.3. use input devices	**3**	Mouse, Keyboard, Voice, TID
	7.3.3. use text processing applications	**3**	Text processors

TOPIC / *SUBTOPIC*	**OBJECTIVES** Students shall ..	**L**	**CONTENT**
	7.3.4. use storage devices	**3**	File systems, hard and floppy disks, tapes
	7.3.5. use CBT programmes.	**3**	
8. AUTOMATION IN ATS			
8.1. *General*	8.1.1. be aware of the principles of automation in ATS communication and data links	**0**	
8.2. *Aeronautical Telecommunication Networks*	8.2.1. name the main aeronautical networks	**1**	AFTN, SITA, CIDIN
	8.2.2. define “AFTN”	**1**	ICAO Annex 10, Vol ll, Chap. 1
8.3. *On-Line Data Interchange (OLDI)*	8.3.1. identify the benefit of automatic exchange of ATS data in co-ordination and transfer processes	**1**	Accuracy, speed and safety, datalinks, sequencing systems (automated information and co-ordination)
8.4. *Closed Circuit Information System (CCIS)*	8.4.1. state the principles of CCIS	**1**	
	8.4.2. explain the use of CCIS in ATS	**2**	Data carried on CCIS
8.5. *ATIS and VOLMET*	8.5.1. state the principles of ATIS and VOLMET	**1**	
	8.5.2. explain their use in ATS.	**2**	
9. WORKING POSITIONS			
9.1. *General*	9.1.1. identify equipment in a working position.	**1**	Radio, telephone and other communication equipment, relevant maps and charts, strip printer, teleprinter, clock, information monitors

2.12 Miscellaneous

The general objectives for Miscellaneous are to:
(I) identify the need for close co-operation with other agencies concerning AIS operations;
(ii) recognise the importance of environmental protection.

TOPIC / *SUBTOPIC*	**OBJECTIVES** *Students shall ...*	**L**	**CONTENT**
1. STUDY VISITS			
1.1. *Study visits*	1.1.1 be familiar with civil and military ATM facilities.	**0**	Such as: TWR, APP, ACC, AIS, RCC, Radar, Air Defence, FMP
	1.1.2. be familiar with airport facilities and local operators.	**0**	Such as: Fire & Emergency Services, Airline Operations Office
2. AIRSPACE USERS			
2.1. *Civil Aviation*	2.1.1. list airspace users.	**1**	Commercial aviation, recreational flying, gliders, balloons, military etc.
	2.1.2. be aware of the requirements for the different airspace users	**0**	Scheduled flights, low-level flights, in-flight refuelling, exercise areas, test flights, training flights etc.
3. CUSTOMER RELATIONS			
3.1. *Customer Relations*	3.1.1. identify the role of AIS as a service provider.	**1**	
	3.1.2. be aware of the specific requirements for AIS by different airspace users.	**0**	
	3.1.3. recognise the means by which AIS is funded.	**1**	
4. ENVIRONMENTAL PROTECTION			
4.1. *Environmental protection*	4.1.1. recognise the importance of environmental protection.	**1**	Air, water and noise pollution

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ANNEX A: REFERENCES

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[Ref. 2] EUROCONTROL, EATCHIP Work Programme Document, Human Resources Business Plan, Edition 3.0, 29/03/96.

[Ref. 3] Convergence and Implementation Programme Document (Part 1), Edition 3.0.

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ICAO Doc 7030 Regional Supplementary Procedures

ICAO Doc 8168 Aircraft Operations, 4th Edition 1995

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ICAO Doc 8643 Aircraft Type Designators, 25th Edition 1997

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ICAO Annex 2 Rules of the Air, 9th Edition 1996

ICAO Annex 4 Aeronautical Charts, 8th Edition 1985

ICAO Annex 10 Aeronautical Telecommunications, Volume II, 5th edition 1995

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ANNEX B: ABBREVIATIONS AND ACRONYMS

For the purposes of this document the following abbreviations and acronyms shall apply. Those with a specific application are indicated whenever deemed relevant, e.g. 'COM for Communications *(ICAO)'*

ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACK	Acknowledge Message
AD	Aerodrome *(ICAO)*
ADEXP	ATS Data Exchange Presentation
ADF	Automatic Direction Finding Equipment
ADS	Automatic Dependent Surveillance
AFTN	Aeronautical Fixed Telecommunication Network
AIC	Aeronautical Information Circular
AIM	Air Traffic Flow Management (ATFM) Information Message
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Services
AISPOP	AIS Planning and Operations Subgroup *(EATCHIP)*
AIS-TF	AIS Training Task Force *(EATCHIP)*
ANM	ATFM Notification Message
AO	Aircraft Operator
APAPI	Abbreviated Precision Approach Path Indicator
APP	Approach Control
ARC	CFMU Archiving System
ARO	Air Traffic Services Reporting Office

ASHTAM	NOTAM on Ash/Volcanic activity
ASM	Ad-hoc Schedule Message (CFMU)
ASM	Airspace Management
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATS	Air Traffic Services
A-VASIS	Abbreviated Visual Approach Slope Indicator System
BIRDTAM	NOTAM on Bird Activity/Hazard *(unofficial term)*
CAL	Computer Assisted Learning
CASA	Computer Assisted Slot Allocation
CBT	Computer Based Training
CCC	Common Core Content *(EATCHIP)*
CCIS	Closed Circuit Information System
CEU	Central Executive Unit *(CFMU - EUROCONTROL)*
CFMU	Central Flow Management Unit
CIDIN	Common ICAO Data Interchange Network
CIP	Convergence and Implementation Programme *(EATCHIP)*
COM	Communications *(ICAO)*
CTG	Common Training Group
CTMO	Centralised Traffic Flow Management Organisation
DED	Directorate EATCHIP Development *(EUROCONTROL)*
DFTI	Distance From Touchdown Indicator
DME	Distance Measuring Equipment

DOS	Disk Operating System
DVOR	Doppler VOR
EAD	European AIS Database
EATCHIP	European Air Traffic Control Harmonisation and Integration Programme
EATMS	European Air Traffic Management System
ECAC	European Civil Aviation Conference
ECI	EAD Client Interface (EUROCONTROL)
EFIS	Electronic Flight Instrument System
ENR	En Route *(ICAO)*
ENV	CFMU Environment System
ET	Executive Task *(EATCHIP)*
EU	European Union
EUROCONTROL	European Organisation for the Safety of Air Navigation
FDO	CFMU Flight Data Operations Division
FIR	Flight Information Region
FIS	Flight Information Service
FLOWTAM	NOTAM on ATFM Measures (unofficial term)
FMP	Flow Management Position
FMS	Flight Management System
FMU	Flow Management Unit
FPL	(Filed) Flight Plan (ICAO format)
FUA	Flexible Use of Airspace *(EATMS)*
GAT	General Air Traffic
GCA	Ground Controlled Approach
GEN	General *(ICAO)*
GLONASS	Global Navigation Satellite System

GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
GUI	Guidelines *(EATCHIP)*
HF	High Frequency (3,000 - 30,000 kHz)
hPa	HectoPascal
HRT	Human Resources Team *(EATCHIP)*
HUM	Human Resources Domain *(EATCHIP)*
IACA	International Air Carrier Association
IANS	Institute of Air Navigation Services
IAOPA	International Council of Aircraft Owner and Pilot Associations
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IFALPA	International Federation of Air Line Pilots Associations
IFATCA	International Federation of Air Traffic Controllers' Associations
IFPS	(Integrated) Initial Flight Plan Processing System
IFPU	IFPS Unit
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
INO	International NOTAM Operation *(EATCHIP)*
INS	Inertial Navigation System
ISA	International Standard Atmosphere
ISO	International Standards Office
ITF	International Transport Workers' Federation

JAA	Joint Aviation Authorities
MAN	Manual message
MET	Meteorological/Meteorology *(ICAO)*
METAR	Meteorological Aerodrome Report
MHz	Megahertz
MLS	Microwave Landing System
MSG	Message
MTCA	Medium-Term Conflict Alert
NDB	Non Directional Radio Beacon
NOF	International NOTAM Office *(ICAO)*
NOTAM	Notice To Airmen *(ICAO)*
OAT	Operational Air Traffic
OJT	On-the-Job Training
OLDI	On-Line Data Interchange
ORM	Operational Reply Message *(EUROCONTROL)*
PANS	Procedures for Air Navigation Services *(ICAO)*
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
PC	Personal Computer
PIB	Preflight Information Bulletin
PSR	Primary Surveillance Radar
QDM	Magnetic Heading *(ICAO)*
QDR	Magnetic Bearing *(ICAO)*
QFE	Atmospheric pressure at aerodrome elevation *(ICAO)*
QNH	Altimeter setting to obtain elevation when on the ground *(ICAO)*
QTE	True bearing *(ICAO)*

RCC	Rescue Co-ordination Centre
REJ	Reject message
RNAV	Area Navigation
RPL	Repetitive Flight Plan
R/T	Radiotelephony
RTF	Radiotelephone *(ICAO)*
RVR	Runway Visual Range
RWY	Runway *(ICAO)*
SAR	Search And Rescue *(ICAO)*
SARPS	Standards and Recommended Practices *(ICAO)*
SDO	Static Data Operations *(EUROCONTROL)*
SELCAL	Selective Calling System
SIGMET	Significant Meteorological Report
SITA	Société internationale de télécommunications aéronautiques (Airline Telecommunications and Information Service)
SMR	Surface Movement Radar
SNOWTAM	Special series NOTAM on Snow Conditions *(ICAO)*
SPECI	Aviation Selected Special Weather Report (MET code)
SSR	Secondary Surveillance Radar
ST	Specialist Task *(EATCHIP)*
STCA	Short-Term Conflict Alert
STRAT	Strategic system of CFMU *(EUROCONTROL)*
SUPPS	Regional Supplementary Procedures *(ICAO)*
SWY	Stopway *(ICAO)*
TACAN	UHF Tactical Air Navigation Aid
TACT	CFMU Tactical System *(EUROCONTROL)*

TAF	Terminal Area Forecast
TCAS	Traffic Alert and Collision Avoidance System (US)
TDZ	Touchdown Zone
TF	Task Force *(EATCHIP)*
TID	Touch Input Device
TOR	Terms of Reference
TOS	Traffic Orientation Scheme
TSG	Training Sub Group *(EATCHIP - HUM)*
T-VASI	Tee Visual Approach Slope Indicator
TWR	Aerodrome Control (Tower) *(ICAO)*
UDF	Ultra High Frequency Direction-Finding Station *(ICAO)*
UHF	Ultra High Frequency (300 - 3,000 MHz)
VCR	Visual Control Room
VDF	Very High Frequency Direction-Finding Station *(ICAO)*
VFR	Visual Flight Rules *(ICAO)*
VHF	Very High Frequency (30 - 300 MHz)
VLF	Very Low Frequency (3 - 30 MHz)
VMC	Visual Meteorological Conditions
VOLMET	Meteorological Information for Aircraft in Flight
VOR	Very High Frequency Omnidirectional Radio Range
WGS-84	World Geodetic System (1984)

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ANNEX C: LIST OF AIS TRAINING TASK FORCE MEMBERS

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