POST GRADUATE DIPLOMA IN SATELLITE AND AERIAL IMAGERY INTERPRETATION

Introduction

1. The Course is conducted under the overall aegis of Faculty of Specialized Intelligence, Military Intelligence Training School and Depot. The course is divided into five phases viz. Aerial Phase, Concept of Remote Sensing & Imagery Interpretation Phase, Software Phase, Project and Outdoor Visits. Each phase has theory as well as practical classes.

Eligibility Criteria

2. Entry requirements are as under :-

(a) Commissioned officers of Indian Army from Indian Military Academy/Officers Training Academy.

(b) The officer must be qualified in Intelligence Orientation Course/Junior Command.

(c) Must have basic knowledge of computers and preferably be a Science Graduate.

(d) Completed 06 years of specialized field training in units and formation headquarters.

Duration

3. The total duration of course is 16 weeks at Military Intelligence Training School and Depot (MINTSD). Before joining the course the officers must have completed 06 years of specialized field training in units and formation headquarters.

Structure

4. Post Graduate Diploma in Satellite and Aerial Imagery Interpretation for Officer will include the following papers :-

Paper	Subject	Theory	Practical
Aerial Phase			
001	Introduction to Aerial Photography	10	06
002	Interpretation of Vertical Air Photo	31	17
003	Interpretation of Oblique Air Photo	48	24
Concept of Remote sensing & Imagery Intelligence Phase			
004.	Concept of Remote Sensing (including Quiz -1)	24	-
005.	Data Processing	-	03

Paper	Subject	Theory	Practical
006.	Digital Image Processing (including Quiz -ll)	15	07
007.	Unmanned Aerial Vehicle	02	
008.	Imagery Intelligence (Road, Railway, Bridge, Defence, Artillery, Armed and Air Field)	52	18
Software Phase			
009.	Intro to work Station and computer (IT Training)	05	36
010.	Microstation	35	19
011.	Image Analyst	70	37
012.	MTA	33	22
013.	Photogrammetry	39	14
014.	Fotorite/Photo Processor	21	04
015.	Scanner including PSTD	35	16
016.	Zoom 500	07	03
017.	Introduction to Lamination Machine	04	03
018.	Data Back up and Restoring	02	03
019.	Geo-media	50	81
020.	Demand of Satellite Data	03	03
Projects & Visit Phase			
021.	GIS Project	89	49
022.	Model IP Project	04	07
023	Visit	42	84

Standard of Passing

5. A candidate will be required to obtain a minimum of 40% marks overall. Marks of internal assessment will be included in overall assessment.

Internal Assessment

6. The course will assessed out of total 1000 marks, which will be distributed as under:-

Ser No	Aspect	Marks
(a)	Written Examinations	400
(b)	Individual Exercises	430
(c)	Work and Visits	170
	Total	**1000**

Submission

7. On completion of research work (own time work) related to Intelligence. The students will submit their project study (papers) to the concerned faculty and will be followed by a presentation by the student on the subject .

Award of Classes

8. An officer will be awarded following grading :-

(a) 70% and above - Distinction or 'A' grading.

(b) 60% to 69.9% - First Class or 'B' grading.

(c) 50% to 59.9% - Second Class or 'C' grading.

(d) 40% to 49.9% - Third Class or 'E' grading.

Fees

9. No tuition fee will be charged from the students. However, students are liable to pay University admission, registration, eligibility, examination etc fee as laid down by University of Pune from time to time.

POST GRADUATE DIPLOMA IN SATELLITE IMAGERY INTERPRETATION FOR OFFICER

(DETAILED SYLLABUS : AERIAL PHASE)

Paper 001 : INTRODUCTION TO AERIAL PHOTOGRAPHY

Topics		Periods
1.	Glossary of Air Photos Terms.	02
2.	Types of Air Photo.	01
3.	PD Grid	01
4.	Stereoscopy	05
5.	Principles of Interpretation	02
6.	Laying of Loose Mosaic	05
Total		**16**

Paper 002 : INTERPRETATION OF VERTICAL AIR PHOTO

Topics		Periods
1.	Scaling on Vertical Photo	13
2.	Measurement of Length, Width & Area of objects, on vertical photo.	13
3.	Measurement of Heights	18
4.	Indoor Exercise – Scaling and Measurement (Vertical)	04
Total		**48**

Paper 003 : **INTERPRETATION OF OBLIQUE AIR PHOTO**

Topics		**Periods**
1.	Basic Trigonometry and Use of Scientific Calculators	02
2.	Intro to Oblique Metrics	02
3.	Preparation of Prints	01
4.	Measurement of Objects along Parallel	10
5.	Measurement of Objects along Meridians	13
6.	Measurement of Objects along Diagonals	19
7.	Measurement of Height	18
8.	Indoor Exercise – Scaling and Measurement on Oblique	07
Total		**72**

POST GRADUATE DIPLOMA IN SATELLITE IMAGERY INTERPRETATION FOR OFFICERS

(DETAILED SYLLABUS : CONCEPT OF REMOTE SENSING AND IMAGERY INTERPRETATION INTELLIGENCE PHASE)

Paper 004 : **CONCEPT OF REMOTE SENSING (INCLUDING QUIZ-I)**

Topics		**Periods**
1.	Glossary of Remote Sensing (RS)	03
2.	Satellites, Orbits and System Parameters	02
3.	Electromagnetic Rediation (EMR)	02
4.	Layers of Atmosphere	02
5.	Type of Imageries	01
6.	Introduction to Imagery Interpretation (IMINT)	03
7.	Micro Wave Remote Sensing	04
8.	Emissivity and Radiation	02
9.	Platform Sensor and Scanner	02
10.	Quiz - I	03
Total		**24**

Paper 005 : **DATA PROCESSING**

Topics		**Periods**
1.	Data Transfer from Media to Work Station	**03**
Total		**03**

Paper 006 : **DIGITAL IMAGE PROCESSING**

Topics		**Periods**
1.	Digital Image Processing (DIP)	09
2.	Resolution	02
3.	Data Management	09
4.	Colour Theory	02
Total		**22**

Paper 007 : **UNMANNED AERIAL VEHICLE**

Topics		**Periods**
1.	Unmanned Aerial Vehicle (UAV) Data Handling	**02**
Total		**02**

Paper 008 : **IMAGERY INTERPRETATION INTELLIGENCE (ROAD, RAILWAY, BRIDGE, DEFENCE, ARTILLERY, ARMOURED AND AIR FIELD)**

Topics		**Periods**
1.	Railway Facilities	03
2.	Roads	11
3.	Bridges	11
4.	Imagery Intelligence (IMINT) Report Writing	03
5.	QUIZ – II	03
6.	Artillery	06
7.	Infantry Defence	03
8.	Armour	05
9.	Imagery Intelligence (IMINT) Report Defence and Communication	04
10.	Military Installations	08
11.	Air Field Facilities	06
12.	Indoor Exercise – Imagery Intelligence (IMINT) Report Writing(Defence and Communication)	09
Total		**72**

POST GRADUATE DIPLOMA IN SATELLITE IMAGERY INTERPRETATION FOR OFFICER

(DETAILED SYLLABUS : SOFTWARE PHASE)

Paper 009 : **INTRODUCTION TO WORK STATION AND COMPUTER**

Topics		**Periods**
1.	Introduction to Work Stations	01
2.	Introduction to Software	01
3.	Computer IT(Computer) Training	21
4.	Internet	12
5.	Technique of Making PPT	06
Total		**41**

Paper 010 : **MICROSTATION**

Topics		**Periods**
1.	Microstation	02
2.	Creation of Design File	04
3.	Microstation-Main Menu and Tools Bar	21
4.	Creation of Design File Military Intelligence Training School and Depot (MINTSD)	03
5.	Creation of Cell and its Placement	06
6.	Reference Attachment of design file	07
7.	Capturing of Image	04
8.	Practical Test– I (Microstation)	07
Total		**54**

Paper 011 : **IMAGE ANALYST**

Topics		**Periods**
1.	Introduction to Image Analyst	02
2.	Opening of Image	04
3.	Extract, Mosaic, Collage	07
4.	Contrast Stretching, Density Slicing and Image Classification	11
5.	Image Geometry (Image Rotate, Flip and Over view) and Grid Generation	16
6.	Map projection	03
7.	ZICSO/Map Projection	07
8.	Warping Image to Map	14
9.	Warping Image to Image	11
10.	File Conversion	02
11.	Identification of Military Objects	08
12.	Image Fusion	02
13.	Geo Ref QB Data	06
14.	Geo Ref TES Data	07
15.	Indoor Exercise – Practical Test – II (Image Analyst).	07
Total		**107**

Paper 012 : **MTA**

Topics		**Periods**
1.	MTA	02
2.	Contour Tagging	10
3.	TIN Generation	09
4.	Image Drape	07
5.	Relief display	07
6.	MTA Terrain Analyst	10
7.	Indoor Exercise – Practical Test – V (MTA)	07
8.	Indoor Exercise – Quiz – III	03
Total		**55**

Paper 013 : **Photogrammetry**

Topics		**Periods**
1.	Concepts of Digital Photogrammetry	02
2.	Interior Orientation	05
3.	Relative Orientation	11
4.	Absolute Orientation	13
5.	Photogrammetry project Satl Images	11
6.	Anaglyph Model	04
7.	Indoor Exercise - Practical Test – IV (Photogrammetry)	07
Total		**53**

Paper 014 : **FOTORITE/PHOTO PROCESSOR**

Topics		**Periods**
1.	Introduction to Fotorite and Photo Processor	03
2.	Image Transfer	03
3.	LUT Generation	01
4.	Image Map Generation	07
5.	Practical	07
Total		**21**

Paper 015 : **SCANNER INCLUDING PSTD**

Topics		**Periods**
1.	Scanning Fundamentals	06
2.	Dia-positive Scanning	08
3.	AO Size Scanner	09
4.	Auto Scanning	11
5.	Manual Scanning	10
6.	Practical Test – III (PSTD)	07
Total		**51**

Paper 016 : **ZOOM 500**

Topics		**Periods**
1.	Zoom 500	**03**
Total		**03**

Paper 017 : **INTRODUCTION TO LAMINATION MACHINE**

Topics		**Periods**
1.	Introduction to Lamination Machine	**07**
Total		**07**

Paper 018 : **DATA BACKUP AND RESTORING**

Topics		**Periods**
1.	Data Backup and Restoration.	**05**
Total		**05**

Paper 019 : **GEO-MEDIA**

Topics		**Periods**
1.	Introduction to GIS	03
2.	Introduction to Geo Media	01
3.	CAD Server Schema	07
4.	Creation of Workspace and Warehouse	13
5.	CAD Connection and Legend Entry	11
6.	Insert New Features and Digitization	11
7.	Registration of Image/Raster Map	03
8.	MTA Menu	07
9.	Creation of Attribute Table	07
10.	Introduction to Google Earth	02
11.	Fly Through Model	11
12.	Query Analysis	06
13.	Analysis of Non Graphic Data	05
14.	Thematic Map Generation	02
15.	Printing and Plotting	09
16.	Intro to BHUMICA	11
17.	I-GIS Project	15
18.	Indoor Exercise -Practical Test - VI (Geo-media)	07
Total		**131**

Paper 020 : **DEMAND OF SATELLITE DATA**

Topics		**Periods**
1.	Demand of Satellite Data	**06**
Total		**06**

POST GRADUATE DIPLOMA IN SATELLITE IMAGERY INTERPRETATION FOR OFFICER

(DETAILED SYLLABUS : PROJECTS AND VISIT PHASE)

Paper 021 : **GIS PROJECT**

Topics		**Periods**
1.	Presentation GIS Project	07
Total		**07**

Paper 022 : **SPACE SCIENCE PROJECT**

Topics		**Periods**
1.	Space Science Project Presentation	03
Total		**03**

Paper 023 : **MODEL IP PROJECT**

Topics		**Periods**
1.	Preparation Model IP	03
2.	Indoor Exercise - Model IP	04
Total		**07**

Paper 009 : **VISITS**

Topics		**Periods**
1.	Visit Marshalling Yard Ghorpuri, Pune	04
2.	Visit HQ College of Mechanical Engineering Pune	14
3.	Visit BARC, BPCL, Naval Dockyard and RIL	07
4.	Visit AF Station Lohegaon Pune	07
5.	Visit C DAC Pune	07
6.	Visit School of Arty and ACC & Centre	07
7.	Visit NRSA and speck sys	04
Total		**50**

Bibliography

Military Intelligence Training School and Depot Précis	:	(a)	Aerial Photography
		(b)	Digital Image Interpretation
		(c)	Handbook on software workflows.
User Handbooks	:	(a)	Microstation
		(b)	Image Analyst
		(c)	Geomedia
		(d)	Bhumika
		(e)	Photogrammetry
		(f)	MGE Terrain Analyst
Reference Books	:	(a)	Manual of Remote Sensing Vol-I By David S. Simonett
		(b)	Manual of Remote Sensing Vol-II By John E. Estes
		(c)	Processing of Remote Sensing By Michel Claude Girard
		(d)	Acoustic Remote Sensing Application By SP Singal
		(e)	Remote Sensing IInd Edn By Robert A. Schowengerdt
		(f)	Remote Sensing & Image Interpretation By Thomas M Lillesand
		(g)	Fundamental of Geographical Information system By Michael N. Demers
		(h)	Fundamental of Remote Sensing By George Joseph
		(j)	National Geographic Satellite Atlas of the world By Senator John Glenn
		(k)	Geographical Information system & Cartographic Modeling By C Dana Tomlin
		(l)	Manual of Aerial Survey By Roger Read & Ron Graham