PANJAB UNIVERSITY, CHANDIGARH

OUTLINES OF TESTS, SYLLABI AND COURSES OF READING FOR MASTERS IN REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS (

SEMESTER III

Paper VII:	Application of Remote Sensing and GIS in Disaster Management		**200**
	(a) Theory	: 100	
	(b) Practicals	: 60	
	(Lab. work 30 marks+ Record file 20 marks+ Viva 10 marks)		
	(c) Internal Assessment	: 40	
Paper VIII:	Application of Remote Sensing and GIS in Utility Management		**200**
	(a) Theory	: 100	
	(b) Practicals	: 60	
	(Lab. work 30 marks+ Record file 20 marks+ Viva 10 marks)		
	(c) Internal Assessment	: 40	

SEMESTER - I

PAPER - I: FUNDAMENTALS OF REMOTE SENSING, PHOTOGRAMMETRY & GPS
Marks: 200

(a) THEORY **Marks: 100**
Time : 3 Hours

OBJECTIVES:

- to introduce the students to the basic principles of remote sensing;
- to indicate the methods of visual and digital interpretation of aerial photographs and satellite imageries;
- to explain the methods of acquiring remote sensing data and their usage; and
- to train the students about elementary photogrammetry and use of GPS.

COURSE CONTENTS:

UNIT – I

Introduction to remote sensing: Energy and radiation principles, energy-atmosphere interaction, energy-earth surface features interaction, spectral signatures.
Energy Recording Technology: Aerial Photography; Electronic Imaging Devices: Matrix Array, Pushbroom, Wjiskbroom. Remote Sensing Detectors
Resolution of Remote Sensing data: Spatial, spectral, radiometric and temporal.

UNIT – II

Type of aerial photographs and satellite imageries:

2.

NOTE:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. Student will attempt any 10 parts in about 25-30 words each. Each part shall carry 2 marks (total 20 marks).
2. A total of eight questions will be set out of the whole syllabus, at least 2 from each unit, and the candidates will attempt 4 questions selecting one from each unit, in addition to the compulsory question at serial number I.

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Paper III: IMAGE PROCESSING **Marks: 200**

(a) THEORY **Marks: 100**
Time : 3 Hours

OBJECTIVES:

The course is designed to introduce the student to analytical tools and methods which are currently used in digital image processing as applied to image information for human viewing. Then apply these tools in the laboratory in image restoration, enhancement and compression.

UNIT – I

Image processing: definition and types-visual and digital;
Visual image interpretation: Image characteristics, elements of object identification, image interpretation techniques, field verification.

UNIT - II

(v) Image classification techniques: supervised and unsupervised
(vi) Accuracy analysis
(vii) Ground data collection for training sets for classification of image

NOTE: The practical examination shall be conducted by a team of three examiners, including the internal, Chairperson of the Department and one additional faculty member teaching the course.

(c) INTERNAL ASSESSMENT **Marks: 40**

Internal assessment shall be based on Written Test, Snap Test, Participation in Class discussion, Term Paper and Attendance as prescribed by the university.

BOOKS RECOMMENDED

ESSENTIAL READINGS

Burger W., & Burge, M.J. :

SEMESTER II

PAPER IV: REMOTE SENSING & GIS IN HUMAN GEOGRAPHY **Marks: 200**
(with special reference to Urban and Regional Planning)

(b) PRACTICAL **Marks: 60**

(i)

PAPER V: REMOTE SENSING AND GIS IN PHYSICAL GEOGRAPHY Marks: 200
(with special reference to Environmental Management)

Smith, Willam, L. : Remote Sensing Applications for Mineral Exploration, Dawden Hutchintons and Ross Inc.,1977.

PEDAGOGY:

Students may be taken to institutions such as IIRS, NRSA, State Remote Sensing Cetres to acquaint them with equipments, techniques and their products. Students may be asked to prepare a report on landform using topographical sheets, aerial photographs and satellite images. Students may acquaint with the satellite imageries of various kinds of environmental problems.

PAPER VI: CARTOGRAPHY **Marks: 100**

(a) THEORY **Marks : 50**
Time : 3 Hours

OBJECTIVES:

The course is designed to emphasise the relevance and scope of cartography in GIS. It shall highlight the value of this vital field in the current and highly versatile field of GIS.

UNIT - I

- Cartography: Definition, Scope and Historical Perspective.
- Cartography and GIS
- Traditional vs Computer (Digital) Cartography

UNIT - II

- Types of Data: Spatial data and Attribute data
  Spatial Data: Point, line, area
  Attribute Data: Data Analysis and Classification
- Map Types: Quantitative and Qualitative

UNIT - III

- Map Design: Principle of Symbolization, Colour (HB 10.6383(d (e)-2.19149(d)-31.6383( )-5.31655(h)

Rampal, K.K. : *Mapping and Compilation*, Concept Publishing Co., New Delhi, 1993.

Raisz, Erwin : *Principles of Cartography*, McGraw Hill, New York, 1962.

Robinson, A.H. and others : *Elements of Cartography*, John Willy & Sons, New York, 6th edition, 1992.

Singh, R.L.and Singh R.P.B : *Elements of Practical Geography,* Kalyani Publishers , New Delhi, Reprint 2002.

FURTHER READINGS

Birch, T. : *Maps- Topographical and Statistical*, Clarendon Press, Oxford, 1949.

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SEMESTER III

PAPER VII: APPLICATION OF REMOTE SENSING AND GIS IN DISASTER MANAGEMENT **Marks: 200**

PAPER VIII: APPLICATION OF REMOTE SENSING AND GIS IN UTILITY MANAGEMENT **Marks: 200**

(THEORY) **Marks: 100**
Time : 3 Hours

OBJECTIVES:

The main objective of this paper is to expose the students the application of remote sensing and GIS in managing utility services. It further aims at training them to take quick, correct and reliable locational decisions.

Unit I

Utility Description of all essential services and utilities Database development and Data Acquisition Acquiring and integrating the spatial data Spatial Database

Unit II

Spatial Data Manipulation and analysis, Geospatial data analysis and design, Geospatial technology project management, Query Processor and Visualization Applications and Problem solving with GIS
softwares

(B) PRACTICAL

SEMESTER IV

PAPER X: RESEARCH METHODOLOGY, PROJECT FORMULATION AND WRITING

Marks: 100
(Terminal exams: 80 marks)

3.