PANJAB UNIVERSITY, CHANDIGARH

(Estted. under the Panjab University Act VII of 1947- enacted by the Govt. of India)

FACULTY OF ARTS

SYLLABI

FOR

MASTERS IN REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS (RS & GIS) (SEMESTER SYSTEM) EXAMINATIONS, 2014-2015

GUIDELINES FOR CONTINUOUS INTERNAL ASSESSMENT (20%) FOR REGULAR STUDENTS OF MASTERS IN REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS (RS & GIS)

(Semester System)

(Effective from the First Year Admissions for the A

PANJAB UNIVERSITY, CHANDIGARH

Outlines of tests, syllabi and courses of reading for Masters in Remote Sensing and Geographic Information Systems (RS & GIS) (Semester System) for the examinations of 2014-15.

SEMESTER-I			
Paper	**Title**	**Max. Marks**	**Credits**
I	Fundamentals of Remote Sensing (a) Theory : 50 (b) Practical (Lab work 10 marks+ Record file 10 marks+ Viva 10 marks): 30 (c) Internal Assessment : 20	100	4
II	Fundamentals of Photogrammetry (a) Theory : 50 (b) Practical (Lab work 10 marks+ Record file 10 marks+ Viva 10 marks): 30 (c) Internal Assessment : 20	100	4
III	Fundamentals of Geographic Information Systems (GIS) (a) Theory : 50 (b) Practical (Lab work 10 marks+ Record file 10 marks+ Viva 10 marks): 30 (c) Internal Assessment : 20	100r 0	

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:	Spatial Analysis	**200**
	(a) Theory : 100	
	(b) Practicals : 60	
	(Lab. work 30 marks+ Record file 20 marks+ Viva 10 marks)	
	(c) Internal Assessment : 40	
Paper IX:	Research Methodology and Report Writing	**200**
	(a) Theory : 100	
	(b) Practicals : 60	
	(Lab. work 30 marks+ Record file 20 marks+ Viva 10 marks)	
	(c) Internal Assessment : 40	

SEMESTER –IV

	Project Report	**600**
	(a) Mid-Term Appraisal of the Project Report : 100	
	(b) Evaluation of the Project Report : 400	
	(c) Presentation &Viva Voce (50+50) : 100	
	Grand Total	**2400**

NOTE:

1. Those candidates, who wish to discontinue after successful completion of first two

SEMESTER - I

PAPER-I: FUNDAMENTALS OF REMOTE SENSING

Max. Marks	**: 100**
Theory	: 50
Practical	: 30
Internal Assessment	: 20

OBJECTIVES: To introduce the basic principles of remote sensing, satellite systems and their functioning, and applications of remote sensing technology.

(A) THEORY **Marks: 50**

Time: 3 Hours

PAPER II: FUNDAMENTALS OF PHOTOGRAMMETRY

Max. Marks	**: 100**
Theory	: 50
Practical	: 30
Internal Assessment	: 20

Objectives: The aim of this paper is to provide a general overview of Photogrammetry, its theory and general working principles; to introduce the basic concepts and significance of Photogrammetry and to provide a practical understanding of principles of measurement from vertical aerial photographs.

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

UNIT I

i. Photogrammetry: Definition and Categories
ii. Historical Background: Early Developments in Aerial Surveying and Mapping
iii. Problems of Aerial Photogrammetry
iv. Application of Photogrammetry

UNIT II

v. Basic Mathematics of Photogrammetry: Geometry of Aerial Photographs
vi. Calculation of Photo Scale,
vii. Relief Displacement: Concept and Calculations
viii. Parallax: Concept and Determination
ix. Calculation of Height of Objects on Vertical Aerial Photograph

UNIT III

x. Stereoscopy: Definition
xi. Principles of vision, Binocular Vision, Stereoscopic Vision Testing,
xii. Pseduoscopic Views
xiii. Types of Stereoscopes and their Operations

UNIT IV

xiv. Photogrammetry in the Space Age
xv. Photogrammetry for Missiles and Satellite Tracking
xvi. Ortho-photos and Contour Extraction

NOTE:

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3.

PAPER III: FUNDAMENTALS OF GEOGRAPHIC INFORMATION SYSTEMS (GIS)

6. Spatial Representation: Mapping Techniques
7. Spatial Representation: Symbolizing and Map Layouts
8. Basic Analysis in GIS: Buffering, Overlay and Query Building

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: 20**

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

LIST OF READINGS

Essential Readings:

1. Harvey, F., *A o G , n n G o ½ n C o ½ Con ½ ,* Guilford Press, New York, 2008.
2. Ian Heywood,Sarah Cornelius and Steve Carver, *An ,n o on o G o ½ ,n o on / ,* 3rd Edition, Pearson, Dorling Kindersley (India) Pvy. Ltd, 2010.
3. Kang-tsung (Karl) Chang, *,n o on o G o ½ ,n o on / ,* 4th Edition, Tata McGraw-Hill, New Delhi, 2009.
4. Maguire, D.J.; M. Batty and M.F. Goodchild, *G , ½ An / n o n ,* ESRI Press, 2005.
5. Michael F. Goodchild, *,n o on o G ,* Santa Barbara, California, & Karan K. Kemp (eds.) NGGIA, 1990.
6. Muralikrishna, I.V., *o n n A½ on n G o ½ ,n o on / n n ,* Tata McGraw Hill, New Delhi, 1992.
7. Wise, S.,*G , n n ,* 2nd Edition, CRC Press, Taylor & Francis Group, 2013.

Further Readings:

1. Aronoff, S., *G o ½ ,n o on / , A n n ½ ,* WDL Publications Ottawa,Canada, 1992.
2. Burrough, P.A. & Macdoneli, R.A., *n ½ o G o ½ ,n o on / ,* Oxford University Press, 2000.
3. Demers, M.N., *n n o G o ½ ,n o on / ,* 2nd Edition, John Wiley and sons, 2000.
4. Jefrey S. & John, E., *G o ½ ,n o on /* .(.(, .(n

NOTE:

1. A Compulsory Question at serial number I containing 10 short answer type questions shall be set covering the whole syllabus. Student will attempt any 7 parts in about 25-30 words each. Each part shall carry 2 marks (total 14 marks).
2. A total of eight questions will be set out of the whole syllabus, at least 2 from each unit. The candidates will attempt 4 questions selecting one from each unit carrying 9 marks each (total 36 marks). These will be in addition to the Compulsory Question at serial number I.

SEMESTER-II

3. Generation of Hill Shading Map
4. Profiles: Longitudinal and Transverse Profiles
5. Interpretation of Physical and Cultural features fr

(B) PRACTICAL **Marks: 30**

1. Familiarization with Spatial Analysis Software.
2. Measuring Mean Centre, Weighted Mean Centre and Median Centre
3. Measuring Standard Distance and Standard Distance Ellipse
4. Nearest Neighbour Analysis
5. Spatial Autocorrelation of Point Features
6. Network Analysis
7. Vector Analysis: Buffering, Overlay and Query
8. Surface Analysis: Digital Elevation Model (DEM), Digital Terrain Model (DTM)

PAPER VII: IMAGE PROCESSING

Max. Marks	**: 100**
Theory	: 50
Practical	: 30
Internal Assessment	: 20

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.

(A) THEORY **Marks: 50**

Time: 3 Hours

UNIT – I

i. Digital Image Pre-processing: Sources of Errors, Types of Error- Radiometric and Geometric

ii.

NOTE:

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,

UNIT - IV

Spatial Modeling

- Model building
- Multiple Regression
- Logistic Regression
- Data Manipulation and Programming

Surface Analysis

- Digital Elevation Model (DEM) and Digital Terrain Model (DTM)
- Contouring, Hill Shading and Perspective View (3D viewing)
- Slope and Aspect Analysis

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.

(b) PRACTICAL **Marks: 60**

(i) Familiarization with Spatial Analysis Software.
(ii)

Chou, Yue-Hong : *Introduction to Modern Statistical Modeling*, OnWord Press, 1997.

Laurini, R. & Thomson, D. : *Fundamentals of Spatial Information Systems*, Academic Press, 1994.

Wong, David W.S. & Jay Lee : Statistical Analysis of Geographic Information With ArcView GIS and ArcGIS, John Wiley and Sons, 2005.

FURTHER READINGS

Burrough, P.A. & Macdoneli, R.A. : *Principles of Geographical Information Systems*, Oxford University Press, 2000.

Demers, M.N. : *Fundamentals of Geographic Information Systems*, 2nd Edition, John Wiley and sons, 2000.

Muralikrishna, I.V. : *Database Management Systems*, Tata McGraw Hill, 1992.

Rashid, S.K. : Remote Sensing in Geography, Manak Publications, 1993.

Rees, W.G. : Physical Principles of Remote Sensing, Cambridge University Press, 1990.

PEDAGOGY:

Students may be asked to prepare a report on spatial analysis applications using external and self generated databases. Students will be encouraged to ask questions and participate in classroom discussions.

PAPER IX: RESEARCH METHODOLOGY AND REPORT WRITING

Marks: 200

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

OBJECTIVES:

The aim of this paper is to train the students about the various aspects of research writing so that they are in a position to write research reports independently.

COURSE CONTENT:

UNIT-I

i. Meaning, objectives and Types of Research, Research approaches and significance of research.
ii. The research process: the broad problem area, preliminary data collection, problem, selection and definition, theoretical framework, hypothesis development and elements of research design.
iii. Experimental design: the laboratory experiment, variables, validity, types of experimental designs.

Bailey, Kenneth D.(1978)	:	Methods of Social Research, New York
Berdie,Douglas R and Anderson, John F.	:	Questionnaires; Design and Use, Metuchen NJ. The Scarecrow Press, Inc.
Creswell, John W. (2008)	:	Research Design; Qualitative, Quantitative and Mixed Methods Approach, SAGE

(iii) In case of project report, the Board of Control shall assign a candidate to a faculty member/s for supervision of his/her report on an approved topic. The student shall prepare three copies of his/her project report and submit in the concerned department. The report shall have to be submitted ten days before the commencement of the theory examination of the said semester. The project report shall incorporate the findings arrived at on the basis of the data/information collected from the field and processed, analyzed and mapped in the GIS lab.

For the evaluation of project report, three examiners, consisting of supervisor, chairperson of the department, and one more faculty member teaching the course, shall evaluate the field report, submitted by the student, independently and student shall be awarded the mean score of the three evaluations. The evaluation process shall have the two-components: (i) evaluation of report, (ii) presentation of data analysis and main findings before the board of examiners and viva voce.

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