# Shivaji University, Kolhapur Department of Geography

(Faculty of Science) Academic Flexibility



# *Revised Syllabus* of P.G. DIPLOMA IN GEOINFORMATICS

Implemented From.... June, 2012 Onwards

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# Shivaji University, Kolhapur Department of Geography PG Diploma in Geoinformatics (1 year)

Course Type: Annual (Self-financed)

**Course Duration:** 1 Year (starting from June-July every year)

Eligibility: Graduate in any discipline

**Desirable:** Knowledge of computer applications

**No. of Seats:** = 35 [Merit list will be prepared based on Graduation marks (60% weightage) and Interview (40% weightage)]

Fees: Rs. 18,000/- Tuition fees plus other university fee (Annual)

Commencement of Classes: First week of July every year

Class Date & Time: Tue, Wed, Thu, & Fri - 2.00 to 6.00 PM

Paper	Paper	Title of the Paper					
Coue	туре		WIAFKS				
PGD-101	Theory	Surveying, Cartography and Digital Image Processing	100				
PGD-102	Theory	Fundamentals and Applications of Remote Sensing	100				
PGD-103	Theory	Fundamentals of Geographical Information System (GIS)	100				
			1				
PGD-104	Practical	Surveying, Cartography and GPS	100				
PGD-105	Practical	Photogrammetry, Remote Sensing and Digital Image Processing	100				
PGD-106	Practical	Geographical Information System (GIS)	100				
			1				
PGD-107	Project	Dissertation (4 months), Seminar & Viva-voce	200				
Theory: 300 marks, Practical: 300 marks, and Project: 200 marks 80 Total:							

## **Course Structure:**

### Scheme of Examination:

There will be an **internal evaluation of 30 marks** in each theory paper (excluding practical paper and project). Internal evaluation marks includes class test (10 marks), Assignment (10 marks) and seminar (10 marks) for theory papers and for practical papers, internal evaluation based on Practical assignments would be of 30 marks and final practical examination would be of 70 marks [practical Paper (60 marks)and viva voce (10 marks)].

Dissertation/Project Guide will be decided by the course co-ordinator/ HoD based on the student's area of interest and availability of teachers. Dissertation/Project report should be submitted one week before commencement of Semester-end examination (theory/practical). Students may also complete the project under the guidance of scientists/faculty working in reputed institution or Govt. laboratories having prior approval from the department.

Dissertation would be of 200 marks in that 100 marks would be given to project report and 100 marks will be given for presentation and viva voice (50 marks each).

## Scheme of examination:

Examination will be conducted at the end of the academic year. A candidate who fails in a paper or papers can reappear for the same in the subsequent year. A candidate failing in the dissertation shall be required to resubmit his work in the next academic year. The table gives a detailed account of the scheme of papers.

### Passing minimum of marks:

A candidate has to secure not less than 40 per cent of the marks in each paper to successfully complete this course.

# Pattern of question paper:

Theory paper would be of 100 marks and each paper will have 70:30 pattern. 30 marks will be for internal evaluation through Assignment, seminar and internal test and 70 marks for final examination. In final examination, the theory question paper will be having following pattern.

Question	Type of	No of questions	Number of	Marks	Total
No.	Question	to be asked	questions to be	for each	marks
			answered.	question	
1	Objective	5	5	2 marks	10
	Туре				
2	Short	6	5	3 marks	15
	answer				
	type				
3	Short	6	5	5 marks	25
	note type				
4	Long	3	2	10	20
	questions			marks	
Total marks					

# Theory I: Surveying, Cartography and Digital Image Processing

## Unit-1: Surveying & Map Projection (12)

The Earth: its shape and size; Datum and co-ordinate systems; Geographical and projected co-ordinate system and grid system; Choice and classification of map projections; Curvature of the Earth and its effect on surveying; Trigonometrical surveying; Calculation of height & distance; Introduction to surveying instruments;

# Unit-2: Global Positioning System (10)

Introduction to GPS; Types of GPS; GPS satellite; data receiver and control points; Differential GPS; Sources of GPS errors; Application of GPS in surveying, mapping and navigation.

# Unit-3: Cartography (12)

History and Development of Cartography; Sources of cartographic data; Scale: types & importance; Cartographic methods and techniques for preparation of maps and diagrams; General maps: types and applications; Thematic maps: types and applications; Introduction to Digital Cartography.

### Unit-4: Digital Image Processing (14)

Digital image: Introduction and data formats; Introduction to image processing; Sources of Errors: Geometric ad radiometric; Image rectification; Image enhancement: methods and techniques; Image classification: supervised and unsupervised; Image accuracy assessment.

- 1. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Longman, Harlow.
- 2. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
- 3. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. John Wiley and Sons, New York.
- 4. Fraser Taylor, D.R. (ed.) (1983): Graphic Communication and Design in Contemporary Cartography. John Wiley and Sons, New York.
- 5. Griffith, D. A. and Amehein (1997): Multivariate Statistical Analysis for Geographers. Prentice Hall, Englewood Cliffs, New Jersey.
- 6. Griffith, D. A. and Amehein (1997): Statistical Analysis for Geographers. Prentice Hall, Englewood Cliffs, New Jersey.
- 7. Kanetkar, T.P. and Kulkarni, S.V. (1967): Surveying and Levelling, Part II, A.V.G. Prakashan, Poona.

- 8. Keates, J.S. (1973): Cartographic Design and Production, Longman Group Ltd.
- 9. Mailing, D.H. (1973): Co-ordinate Systems and Map Projections. George Philip and Sons Ltd.
- 10. Monkhouse, F.J. and Wilkinson, H. R (1962): Maps and Diagrams, Methuen and Company Ltd. and Company Ltd., London.
- 11. Nag, P. (ed.) (1984): Census Mapping Survey, Concept Publishing Company, New Delhi.
- 12. Nair, N. B. (1996): Encyclopaedia of Surveying, Mapping and Remote Sensing. Rawat Publications., Jaipur and New Delhi.
- 13. Raisz, E. (1962): Principles of Cartography. McGraw Hill Books Company, Inc., New York.
- 14. Misra, R.P. and Ramesh, A. (1999): Fundamentals of Cartography. Concept Publishing Company, New Delhi.
- 15. Rhind, B. and Adams, T. (ed.) (1983): Computers in Cartography. British Cartographic Society, London.
- 16. Rice Oxley, M.K. and Shearer, W.V. (1929): Astronomy for Surveyors.Methuen and Company Ltd. and Company, London.
- 17. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984): Elements of Cartography. 6<sup>th</sup> edition John Wiley and Sons, New York.
- 18. Shaw, G. and Wheeler, D. (1994): Statistical Techniques in Geographical Analysis. Prentice Hall, Englewood Cliffs, New Jersey.
- 19. Singh, R. L. and Singh, Rana P.B. (1993): Elements of Practical Geography. Kalyani Publishers, Ludhiana and New Delhi. (English and Hindi editions).
- 20. Strahler, A.N. (1971): The Earth Sciences. Harper and Row Publishers; New York.
- 21. Thrower, N. (1996): Maps and Civilisation. Cartography, Culture and Society. University of Chicago Press, Chicago.
- 22. Unwin, D. (1982): Introductory Spatial Analysis. Methuen and Company Ltd., London.
- 23. Walford, N. (1995): Geographical Data Analysis. John Wiley and Sons, Chichester.

# Theory II: Fundamentals and Applications of Remote Sensing

#### Unit-1: Introduction & Principles of Remote Sensing (16)

**Basics:** Definition and scope of remote sensing; History and development of remote sensing technology; Electromagnetic radiation (EMR) and electromagnetic spectrum; EMR interaction with atmosphere and earth surface; Atmospheric window and spectral reflectance curve; Resolutions in remote sensing; Types of remote sensing; Principles and applications of optical, thermal & microwave remote sensing; Introduction to hyperspectral remote sensing.

#### Unit-2: Aerial photography (10)

Aerial photographs: types, scale, & resolution; Types of aerial cameras and photographic films; Geometry of aerial photographs; Flight planning; Impact of season, time, & topography on aerial photographs; Parallax, relief displacement, and orthophotos.

#### Unit-3: Satellite remote sensing (12)

Satellite: types and their characteristics; Types of Sensors; Orbital and sensor characteristics of major earth resource satellites: LANDSAT, SPOT, IRS, & Quickbard; Recent developments of Indian remote sensing satellite programme; Environmental, meteorological & communicational satellites.

#### Unit-4: Image Interpretation & Applications of Remote Sensing in Geography (10)

Elements of visual image interpretation; Aerial photos vs. satellite imagery; Application of remote sensing in (a) Land use/ land cover mapping, (b) Landform analysis, (c) Resource evaluation, (d) Natural hazards assessment, and (e) Urban & regional planning.

- 1. Aber, J.S., Marzolff, I., and Ries, J. (2010): *Small-Format Aerial Photography: Principles, Techniques and Geoscience Applications,* Elsevier, Amsterdam, 268pp.
- 2. Campbell, J.B., and Wynne, R.H. (2011): Introduction to Remote Sensing (5th Ed.), Guilford Press, New York, 667pp.
- 3. Jensen, J.R. (2006): Remote Sensing of the Environment: An Earth Resource Perspective (2nd Ed.), Prentice Hall, New Jersey, 608pp.
- 4. Konecny, G. (2003): Geoinformation: Remote sensing, Photogrammetry and Geographic Information Systems, Taylor & Francis, London, 266pp.
- 5. Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. (2007): *Remote Sensing and Image Interpretation (6th Ed.)*. Wiley, New Jersey, 804pp.
- 6. Morgan, D., and Falkner, E. (2001): Aerial Mapping: Methods and Applications (2nd Ed.), CRC Press, Boca Raton, Florida, 216pp.
- 7. Quattrochi, D.A., and Goodchild, M.F. (1997): Scale in Remote Sensing and GIS, CRC Press, Boca Raton, Florida, 432pp.
- 8. Reddy, M.A. (2008): Textbook of Remote Sensing and Geographical Information System (3rd Ed.), BS Publications, Hyderabad, 476pp.

- 9. Sabins, F.F. (2007): *Remote Sensing: Principles and Interpretation (3rd Ed.)*, Waveland Press, Long Grove, Illinois, 512pp.
- 10. Schowengerdt, R.A. (2006): *Remote Sensing: Models and Methods for Image Processing (3rd Ed.)*, Elsevier, Amsterdam, 560pp.
- 11. Wolf, P., DeWitt, B., Wilkinson, B. (2012): *Elements of Photogrammetry with Application in GIS (4th Ed.)*, McGraw-Hill, New York, 640pp.

#### Journals:

- 1. Remote Sensing of Environment
- 2. ASPRS Photogrammetric Engineering and Remote Sensing
- 3. IJPRS Journal of Photogrammetry and Remote Sensing
- 4. International Journal of Remote Sensing
- 5. IEEE Transactions on Geosciences and Remote Sensing
- 6. IEEE Letters on Geosciences and Remote Sensing
- 7. Journal of the Indian Society of Remote Sensing

#### Websites:

- 1. Indian Space Research Organisation (ISRO), India: http://www.isro.org
- 2. National Remote Sensing Centre (NRSC), India: http://www.nrsc.gov.in
- 3. National Aeronautics and Space Administration (NASA), USA: <u>http://www.nasa.gov</u>
- 4. National Oceanic and Atmospheric Administration (NOAA), USA: <u>http://www.noaa.gov</u>
- 5. United States Geological Survey (USGS), USA: <u>http://www.usgs.gov</u>
- 6. International Society for Photogrammetry and Remote Sensing (ISPRS): <u>http://www.isprs.org</u>
- 7. Wikimapia: http://www.wikimapia.org
- 8. Bhuvan: http://www.bhuvan.nrsc.gov.in

# Theory III: Fundamentals of Geographical Information System

#### Unit 1: Introduction to GIS (10)

Definition of GIS, History and development of GIS, Components of GIS, Hardwares and Softwares, GIS operations, Future of GIS.

#### Unit 2: Basic GIS (14)

Representation of Geographic features in Raster and Vector data model: Advantages and Disadvantages; Point, line and polygon; Concept of Arc, node and vertices; Spatial data input: Digitization and Conversion, Digitization errors; Topology: Error and editing; GIS data quality: errors, policies.

#### Unit 3: GIS Analysis (12)

Vector data analysis: Buffering, Overlay analysis (point in polygon, line in polygon, polygon in polygon etc.); Network analysis; Terrain analysis: DEM, DTM and TIN; Interpolation techniques in GIS; Raster data analysis; Non-spatial data: Database Management system (DBMS): Components, Schema, Database design, Relationship and Normalization.

#### Unit 4: GIS Applications (12)

Applications of GIS in Urban and Regional planning, Water resource management, Soil resource Management, Forestry and Environment, Public utilities.

- 1. Adriaans, P., and D. Zantinge. 1996. Data Mining. New York: Addison-Wesley.
- 2. Bernhardensen, Tor. 1999. Geographic Information Systems: An Introduction. Toronto: John Wiley & Sons, Inc.
- 3. Bishop, Michael P. and Shroder, John F. (Eds.) 2004. Geographic Information Science and Mountain Geomorphology. Chichester, U.K.: Praxis Publishing (Springer).11
- 4. Bracken, Ian and Webster, Christopher. 1990. Information Technology in Geography and Planning (Including Principles of GIS). London & New York: Routledge.
- 5. Burrough, Peter A. and McDonnell, Rachael A. 1998. Principles of Geographical Information Systems – Spatial Information Systems and Geostatistics. Oxford University Press.
- 6. Buttenfie ld, B.P. and R.P. McMaster 1991. Map Generalization: Making Rules for Knowledge Presentation. New York: Wiley.
- 7. Chang, Kang-tsung. 2002. Introduction to Geographic Information Systems. New Delhi: Tata McGraw-Hill Publishing Company Limited.
- 8. Chrisman, N. 1998. "Academic Origins of GIS," In T. Foresman (Ed): The History of Geographic Information Systems. Upper Saddle River, NJ: Prent ice Hall, pp. 33-43.
- 9. Chrisman, N. 1997. Exploring Geographic Information Systems. New York: John Wiley & Sons, Inc.

- 10. Clarke, Keith C. 2001. Getting Started with Geographic Information Systems (3r d Ed.) (Prent ice Hall Series in Geographic Information Science). Upper Saddle River, New Jersey: Prentice Hall.
- 11. DeMers, Michael N. 2000. Fundamentals of Geographic Information Systems (2n d Ed.) (Wiley Student Edit ion). New York: John Wiley & Sons, Inc.
- 12. Foresman, T. (Ed.) 1998. The History of Geographic Information Systems Perspectives from the Pioneers. Upper Saddle River, NJ: Prentice Hall.
- 13. Gregory, D. 1978. Ideology, Science and Human Geography. New York: St. Martin's Press.
- 14. Heywood, Ian; Cornelius, Sarah; and Carver, Steve. 2000. An Introduction to Geographical Information Systems (Pearson Education Asia Low Priced Edit ion). Longman.
- 15. Kraak, Menno-Jan and Ormeling, Ferjan. 2004. Cartography Visualization of Geospatial Data (2n d Ed.) (Pearson Education Low Price Edition). Pearson Education.
- 16. Lo, C.P. and Yeung, Albert K.W. 2002. Concepts and Techniques of Geographic Information Systems (Eastern Economy Edition). New Delhi: Prentice-Hall of India, Private Limited.
- 17. Longley, P.A., M.F. Goodchild, D.J. Maguire, and D.W. Rhind (eds.). 2001. Geographical Information Systems and Science. New York: John Wiley & Sons, Inc.
- 18. Monmonier, M. 1996. How to lie with Maps? Chicago: University of Chicago Press.
- 19. Pickles, J. 1997. "Tool or Science? GIS, Technoscience, and Theoretical Turn." Annals of the Association of American Geographers, vol. 87,pp. 363-372.
- 20. Schuurman, Nadine. 2000. "Trouble in the Heart land: GIS and its Critics in the 1990s." Progress in Human Geography, vol. 24, no. 4, pp.569-590.
- 21. Schuurman, Nadine and G. Pratt. 2002. "Care of the Subject: Feminism and Critiques of GIS." Gender, Place and Culture, vol. 9, no. 3, pp. 291-299.
- 22. Schuurman, Nadine. 2004. GIS A Short Introduction. Blackwell Publishing.
- 23. Zeiler Michael, 2002, Modeling Our World, The ESRI Guide to Geo Data Base Design, Environmental Systems Research Institute, Inc., Red Lands, California.USA- 92373 -8100.

# Practical I: Surveying, Cartography and GPS

#### **Practical in Surveying**

- 1. Introduction to Surveying
- 2. Theodolite surveying
- 3. Dumpy level surveying
- 4. Introduction to Advance Surveying
- 5. Total station Surveying

#### **Practical in Cartography:**

- 6. Introduction to Map Scale
- 7. Vertical exaggeration of map
- 8. Enlargement and reduction of map
- 9. Map Projection
- 10. Introduction to SOI topographical maps
- 11. Interpretation of SOI maps
- 12. Preparation of Choropleth, Isopleth and Dot maps
- 13. Relief representation techniques
- 14. Study and Interpretation of Cadastral and thematic maps

#### Practical in GPS

- 15. GPS instrument
- 16. Basic functions
- 17. GPS surveying
- 18. Transfer of data in software
- 19. Introduction to DGPS

- 1. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Longman , Harlow.
- 2. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
- 3. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. John Wiley and Sons, New York.
- 4. Fraser Taylor, D.R. (ed.) (1983): Graphic Communication and Design in Contemporary Cartography. John Wiley and Sons, New York.
- 5. Griffith, D. A. and Amehein (1997): Multivariate Statistical Analysis for Geographers. Prentice Hall, Englewood Cliffs, New Jersey.
- 6. Griffith, D. A. and Amehein (1997): Statistical Analysis for Geographers. Prentice Hall, Englewood Cliffs, New Jersey.
- 7. Kanetkar, T.P. and Kulkarni, S.V. (1967): Surveying and Levelling, Part II, A.V.G. Prakashan, Poona.
- 8. Keates, J.S. (1973): Cartographic Design and Production, Longman Group Ltd.

- 9. Mailing, D.H. (1973): Co-ordinate Systems and Map Projections. George Philip and Sons Ltd.
- 10. Monkhouse, F.J. and Wilkinson, H. R (1962): Maps and Diagrams, Methuen and Company Ltd. and Company Ltd., London.
- 11. Nag, P. (ed.) (1984): Census Mapping Survey, Concept Publishing Company, New Delhi.
- 12. Nair, N. B. (1996): Encyclopaedia of Surveying, Mapping and Remote Sensing. Rawat Publications., Jaipur and New Delhi.
- 13. Raisz, E. (1962): Principles of Cartography. McGraw Hill Books Company, Inc., New York.
- 14. Misra, R.P. and Ramesh, A. (1999): Fundamentals of Cartography. Concept Publishing Company, New Delhi.
- 15. Rhind, B. and Adams, T. (ed.) (1983): Computers in Cartography. British Cartographic Society, London.
- 16. Rice Oxley, M.K. and Shearer, W.V. (1929): Astronomy for Surveyors.Methuen and Company Ltd. and Company, London.
- 17. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984): Elements of Cartography. 6<sup>th</sup> edition John Wiley and Sons, New York.
- 18. Shaw, G. and Wheeler, D. (1994): Statistical Techniques in Geographical Analysis. Prentice Hall, Englewood Cliffs, New Jersey.
- 19. Singh, R. L. and Singh, Rana P.B. (1993): Elements of Practical Geography. Kalyani Publishers, Ludhiana and New Delhi. (English and Hindi editions).
- 20. Strahler, A.N. (1971): The Earth Sciences. Harper and Row Publishers; New York.
- 21. Thrower, N. (1996): Maps and Civilisation. Cartography, Culture and Society. University of Chicago Press, Chicago.
- 22. Unwin, D. (1982): Introductory Spatial Analysis.Methuen and Company Ltd., London.
- 23. Walford, N. (1995): Geographical Data Analysis. John Wiley and Sons, Chichester.

# Practical II: Photogrammetry, Remote Sensing and Digital Information System

#### **Practical in Photogrammetry**

- 1. Indexing of aerial photographs.
- 2. Introduction to vertical aerial photographs and its geometry.
- 3. Introduction to stereoscopes
- i) Orientation & construction of 3-D model under Pocket stereoscope.
- ii) Orientation & construction of 3-D model under Mirror stereoscope.
- iii) Stereoscopic Vision test
- 4. Determination of scale
- i) By establishing relationship between Photo distance and Ground distance
- ii) By establishing relationship between Photo distance and Map distance
- iii) By establishing relationship between Focal length and Flying height
- iv) Determination of Average Scale of Vertical Aerial Photograph
- 5. Relief Displacement
- i) Calculation of Relief Displacement
- ii) Object height determination from relief Displacement
- 6. Parallax
- i) Introduction to Parallax bar
- ii) Object height determination from Parallax
- 7. Visual Interpretation and Mapping of Aerial photographs
- i) Land use/ Land cover mapping

#### Practical in Satellite Remote Sensing

- 8. Annotations of Satellite image
- 9. Study of satellite image browsing system
- 10. Visual interpretation of FCC satellite image and Land use/Land cover mapping
- 11. Identification of features in the field using aerial photograph and satellite image.

#### **Practical in DIP:**

- 12. Introduction to DIP software
- 13. Loading of image data, study of histogram and layer information
- 14. Image Rectification and Registration: Image to map, Image to image
- 15. Image Enhancement Techniques: Contrast enhancement-linear and nonlinear
- 16. Histogram equalization
- 17. Density slicing
- 18. Spatial filtering- low and high frequency
- 19. Edge enhancement
- 20. Band ratioing.
- 21. Supervised Classification
- 22. Unsupervised classification
- 23. Accuracy assessment

- 1. American Society of Photogrammetry, (1983). Manual of Remote Sensing, (2nd edition), ASP, Falls Church, Virginia.
- 2. Agarwal, C.S. and Garg, P.K. 2000. Textbook of Remote Sensing in Natural Resources Monitoring and Management. New Delhi: Wheeler Publishing.

- 3. Avery, T.E. 1985. Interpretation of aerial Photographs. Minneapolis, Minnesota: Burgess Publishing Company.
- 4. Bakker, Wim H., et al. 2001. Principles of Remote Sensing An Introductory Textbook. Enschede, The Netherlands: ITC.
- 5. Banerjee, R.K. and Banerjee, B. 2000. Remote Sensing for Regional Development. New Delhi: Concept Publishing Company.
- 6. Campbell, James B. 1996. Introduction to Remote Sensing (Second Edition). London: Taylor & Francis.
- 7. Colwell, Robert N. (ed.) 1983. Manual of Remote Sensing, Second Edition, Volume 1 and 2. Falls Church, Virginia: American Society of Photogrammetry.
- 8. Gibson, Paul J. (2000). Introductory Remote Sensing Principles and Concepts. Rout ledge.
- 9. Jensen, John R. 2000. Remote Sensing of the Environment An Earth Resource Perspective. Pearson Education (First Indian Edition, 2003).
- 10. Hord, R. Michae l. 1986. Remote Sensing Methods and Applications. (A Wiley-Interscience Publication). New York: John Wiley & Sons.
- 11. Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. 2004. Remote Sensing and Image Interpretation (5th Ed.). Wiley. (Wiley Student Edition).
- 12. Miller, V.C. 1961. Photogeology. New York: McGraw-Hill, Book Company, Inc.
- 13. Moffit, H.F., and Edward, M.M., 1980. Photogrammetry, Harperand Row Publishers, New York.
- 14. Paine, D.P. 1981. Aerial Photography and Image Interpretation for Resource Management. John Wiley & Sons.
- 15. Panda, B.C. 2005. Remote Sensing Principles and Applications. New Delhi: Viva Books Private Limited.8
- 16. Rampal, K.K. 1999. Handbook of Aerial Photography and Interpretation. New Delhi: Concept Publishing Company.
- 17. Rashid, S.M. (Ed.) 1993. Remote Sensing in Geography. Delhi: Manak Publications, Pvt. Ltd.
- Reddy, M.A. 2006. Textbook of Remote Sensing and geographicalInformation Systems. Hyderabad: B.S. Publications.
- 19. Sabins F.F Jr.1987, Remote Sensing: Principles and Interpretation, W.H.Freeman & Co., New York.
- 20. Wolf. P .R., 1974 .Elements of Photogrammetry, McGraw Hill books Co., London.

# Practical III: Geographical Information System

#### Introduction to ArcView 3.2a:

- 1. Exploring ArcView interface
- 2. Introducing document windows
- 3. Examine Graphical User Interface (GUI)
- 4. Import/ Export data
- 5. Open a New Project
- 6. Add a View Document to the Project
- 7. Add Themes to the View
- 8. Display and Manage Themes
- 9. Introduction to Extensions
- 10. Open a Table
- 11. Open a Script Window / View a Script
- 12. Query generation
- 13. Chart and layout display

#### Introduction to ArcGIS:

- 14. Overview of ArcGIS : Introduction Arc Map, Arc Catalogue and Arc Toolbox.
- 15. Data formats in ArcGIS: shape and coverage file, import of data, feature class,
- geodatabase, data frames, displaying qualitative/quantitative features, labelling features. 16. Georeferencing in ArcGIS: Coordinating system, datum conversion, map projection,
- storing and viewing projection information.17. Vector data: creating new features, editing functions, digitization, errors and creation of topology.
- 18. Aspatial data: Understanding tables, field types, table manipulation, table relation, creation of graphs and reports.
- 19. Spatial analysis: Query by location/ attribute, Buffer, overlay analysis, Interpolation methods.
- 20. Map design and map composition

#### Introduction to open source software

21. Demo of open source software

- 1. Adriaans, P., and D. Zantinge. 1996. Data Mining. New York: Addison-Wesley.
- 2. Bernhardensen, Tor. 1999. Geographic Information Systems: An Introduction. Toronto: John Wiley & Sons, Inc.
- 3. Bishop, Michael P. and Shroder, John F. (Eds.) 2004. Geographic Information Science and Mountain Geomorphology. Chichester, U.K.: Praxis Publishing (Springer).11
- 4. Bracken, Ian and Webster, Christopher. 1990. Information Technology in Geography and Planning (Including Principles of GIS). London & New York: Routledge.
- Burrough, Peter A. and McDonnell, Rachael A. 1998. Principles of Geographical Information Systems – Spatial Information Systems and Geostatistics. Oxford University Press.

- 6. Buttenfie ld, B.P. and R.P. McMaster 1991. Map Generalization: Making Rules for Knowledge Presentation. New York: Wiley.
- 7. Chang, Kang-tsung. 2002. Introduction to Geographic Information Systems. New Delhi: Tata McGraw-Hill Publishing Company Limited.
- 8. Chrisman, N. 1998. "Academic Origins of GIS," In T. Foresman (Ed): The History of Geographic Information Systems. Upper Saddle River, NJ: Prent ice Hall, pp. 33-43.
- 9. Chrisman, N. 1997. Exploring Geographic Information Systems. New York: John Wiley & Sons, Inc.
- 10. Clarke, Keith C. 2001. Getting Started with Geographic Information Systems (3r d Ed.) (Prent ice Hall Series in Geographic Information Science). Upper Saddle River, New Jersey: Prentice Hall.
- 11. DeMers, Michael N. 2000. Fundamentals of Geographic Information Systems (2n d Ed.) (Wiley Student Edit ion). New York: John Wiley & Sons, Inc.
- 12. Foresman, T. (Ed.) 1998. The History of Geographic Information Systems Perspectives from the Pioneers. Upper Saddle River, NJ: Prentice Hall.
- 13. Gregory, D. 1978. Ideology, Science and Human Geography. New York: St. Martin's Press.
- 14. Heywood, Ian; Cornelius, Sarah; and Carver, Steve. 2000. An Introduction to Geographical Information Systems (Pearson Education Asia Low Priced Edit ion). Longman.
- 15. Kraak, Menno-Jan and Ormeling, Ferjan. 2004. Cartography Visualization of Geospatial Data (2n d Ed.) (Pearson Education Low Price Edition). Pearson Education.
- 16. Lo, C.P. and Yeung, Albert K.W. 2002. Concepts and Techniques of Geographic Information Systems (Eastern Economy Edition). New Delhi: Prentice-Hall of India, Private Limited.
- 17. Longley, P.A., M.F. Goodchild, D.J. Maguire, and D.W. Rhind (eds.). 2001. Geographical Information Systems and Science. New York: John Wiley & Sons, Inc.
- Mitchell, A., 1999, The ESRI G uide to GIS Analysis Volume 1: Geographical Patterns and Relationships, Environmental Systems Research Institute, Inc., Red Lands, California. USA 92373 -8100
- 19. Mitchell, A., Booth Bob and Crosier Scott, 2002, Getting Started with ArcGIS.Environmental Syst ems Research Institute, Inc., Red Lands, California. USA 92373-8100
- 20. Mitchell, A., Booth Bob and Crosier Scott, 2002, Arc GIS Spatial Analyst Environmental Systems Research Institute, Inc., Red Lands, California. USA -92373-8100.
- 21. Monmonier, M. 1996. How to lie with Maps? Chicago: University of Chicago Press.
- 22. Pickles, J. 1997. "Tool or Science? GIS, Technoscience, and Theoretical Turn." Annals of the Association of American Geographers, vol. 87,pp. 363-372.

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# **PROPOSED BUDGET**

# PG Diploma in Geoinformatics Budget Head:

Receipts	Amount	Expenditure	Amount
1) Tuition fee	18000*35=	Honorarium to Co-	24000/-
of 35	6,30,000/-	ordinator	
students		(2000/ <b>-</b> for each	
(Rs. 18000		month)	
/- each)		i.e. 2000*12= 24000	
		Honorarium to	100000/-
		faculty to conduct	
		classes	
		( 500/ <b>-</b> for each	
		theory and practical	
		class)	
		T. A./D.A. for	25000/-
		visiting faculty	
		Guest lecture	30000/-
		( 500/ <b>-</b> for each	
		lecture)	
		Clerk	22000/-
		For eleven month	
		(2000/ <b>-</b> for each	
		month)	
		i.e. 2000*11= 22000	
		Peon assistance	12000/-
		( As per university	
		rule)	
		Computer lab	60,000/-
		maintenance/	
		Softwares	
		Stationary	25,000/-
		Field visits/ Tour	20,000/-
		Dissertation/	25,000/-
		Project Report	
Total	6,30,000	Total	343000/-
Balance	6,30,000-343000 = 2,87,000/-		