ANNEXURE – 1.1

PARVATIBAI CHOWGULE COLLEGE OF ARTS AND SCIENCE
MARGAO – GOA 403601
Affiliated to Goa University
Accredited by NAAC at A Grade

POST GRADUATE DEPARTMENT OF GEOGRAPHY

MASTER OF SCIENCE
In
GEOINFORMATICS

2019-2020

Onwards

        The objective of this degree course is to impart instruction and training to candidates in specialized field of techniques and resources and also intended to develop capacity building for employment, teaching and research.

PARVATIBAI CHOWGULE COLLEGE OF ARTS AND SCIENCE
MARGAO – GOA 403601

POSTGRADUATE DEPARTMENT OF GEOGRAPHY

MASTER OF SCIENCE IN GEOINFORMATICS

Course Structure

Course Code	Course Title	Marks Theory and Practical 50+50	Credits (2+2=4)
SEMESTER I			
PG.MGIS.C1	Basics of GIS and GPS	100	4
PG.MGIS.C2	Basic of RS and Photogrammetry	100	4
PG.MGIS.C3	Geostatistics	100	4
PG.MGIS.E1	Digital Cartography	100	4
PG.MGIS.E2	Principles of Computer and Programming	100	4
SEMESTER II			
PG.MGIS.C4	Spatial Analysis & Modeling	100	4
PG.MGIS.C5	Advanced Remote Sensing and GIS	100	4
PG.MGIS.E3	Digital Image Processing	100	4
PG.MGIS.E4	Programming & Customization	100	4
PG.MGIS.E5	Field techniques Report writing	100	4
SEMESTER III			
PG.MGIS.C6	GIS for Environmental Management	100	4
PG.MGIS.C7	GIS for Urban and Regional Planning	100	4
PG.MGIS.E6	WEB GIS and its Applications in GIS	100	4
PG.MGIS.E7	Research and methodology	100	4
PG.MGIS.E8	GIS for Resource Management	100	4
SEMESTER IV			
PG.MGIS.C8	Project Work	500	20

Note:
1) Duration – 1 lecture of One hour each and One practical/ Laboratory session is equivalent to one contact hour in class room.
2) Each paper will have four instructional contact hours consisting three theory and one practical
3) Total Marks: 2000 (entire course is divided into 15 papers consisting 100 marks each for first 3 semester and a 500 marks project work in 4th semester. Each semester will consist of 20 credits (1 credit = 25 marks) 2 credits for theory and 2credits for practical.
4) Project is the part of paper PG.GIS.C8. Fourth semester is fully devoted to project work.

- C- Core Subject Compulsory

- E- Elective Subject Optional

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M.Sc in Geoinformatics

SEMESTER I
CORE
Course Title: Basics of GIS and GPS
Course Code: PG.MGIS.C1
Credits: 04
Marks:100

Course objective
The course focuses on the fundamentals Geographical Information System, and Global Positioning System by introducing the concept, techniques, hardware and software used in collection, processing and analysis of geospatial data.

Course Outcome
Students will demonstrate proficiency and conceptual understanding in using software and automated techniques to carry out thematic maps and analysis through a series of laboratory exercises and creation of reports

Details of course contents and allotted credits

No	Topic	L	P
I	Introduction to GIS • History and development. • Components and Applications trends of GIS. • Data models: vector and raster • Data type, structure, Spatial and attribute, point, line, polygon- arc, nodes, vertices, and topology. Attribute data. • Data processing systems, input and output devices, editing and attributing and linking	1	1
II	Spatial data inputs • Digitization • Error identification • Types and sources of error • Correction editing and topology building	1	1
III	Introduction to GPS • History of Positioning System GPS System Description, Error Sources & Receiver • Introduction to DGPS and Total Station, GPS Performance and Policy Applications • Introduction to open source GIS		

Reference Books:
1. Bolstad, P. (2005) GIS Fundamentals: A first text on Geographic Information Systems, Second Edition. White Bear Lake, MN: Eider Press, 543 pp.
2. Burrough, P.A. and McDonnell, R.A. (1998) Principles of geographical information systems. Oxford University Press, Oxford, 327 pp.
3. Campbell, J.B. (2002). Introduction to remote sensing, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
4. Chang, K. (2007) Introduction to Geographic Information System, 4th Edition. McGraw Hill.
5. Curran Paul J Principles of Remote Sensing UK: ELBS,

6. Elangovan,K (2006) GIS: Fundamentals, Applications and Implementations. New India Publishing Agency, New Delhi"208 pp.
7. Heywood, I., Cornelius, S., and Carver, S. (2006) An Introduction to Geographical Information Systems. Prentice Hall. 3rd edition.
8. Jensen, J.R. (2000). *Remote sensing of the environment: an Earth resource perspective*. Prentice Hall. ISBN 0-13-489733-1.
9. Joseph, George Fundamentals of Remote Sensing Universities Press India
10. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2003). Remote sensing and image interpretation, 5th ed., Wiley. ISBN 0-471-15227-7.
11. Longley, P.A., Goodchild, M.F., Maguire, D.J. and Rhind, D.W. (2005) Geographic Information Systems and Science. Chichester: Wiley. 2nd edition.
12. Maguire, D.J., Goodchild M.F., Rhind D.W. (1997) Geographic Information Systems: principles, and applications. Longman Scientific and Technical, Harlow.
13. Muralikrishna V Geographical Information Systems and Remote Sensing Applications Allied Publsihers Private Limited
14. Nag P and Kudrat M Digital Remote sensing New Delhi: Concept Publishing
15. Richards, J.A.; and X. Jia (2006). Remote sensing digital image analysis: an introduction, 4th ed., Springer. ISBN 3-540-25128-6.
16. Sabins Floyd F Remote Sensing: Principles and Interpretation New York: WH Freeman and Company
17. Thurston, J., Poiker, T.K. and J. Patrick Moore. (2003) Integrated Geospatial Technologies: A Guide to GPS, GIS, and Data Logging. Hoboken, New Jersey: Wiley.
18. Wise, S. (2002) GIS Basics. London: Taylor & Francis.

CORE
Course Title: Basic of Remote Sensing and Photogrammetry
Course Code: PG.MGIS.C2
Credits: 04
Marks:100

Course objective
Give foundational knowledge about remote sensing and its types and different sensors used for remote sensing which will focus on comprehension of the physical, computational, and perceptual basis for remote sensing. Gain familiarity with a variety of physical, biological, and human geographic applications of remote sensing. Gain basic experience in the hands-on application of remote sensing data through visual interpretation and digital image processing exercises.

Course outcome
Students will be able to understand the concept of remote sensing and EMR apart from this basic level of fundamental physical principles of remote sensing, including the electromagnetic spectrum; the emission, scattering, reflection, and absorption of electromagnetic (EM) radiation; how EM radiation interactions vary across a limited number of substances, geometries, and temperatures; and geometric properties of photographs and imagery.

Details of course contents and allotted credits

No	Topic	L	P
I	Fundamental of Remote Sensing • Introduction, History, development, • stages of remote sensing, EMR & EMR spectrum, EMR Quantities, Energy sources and radiation principles, • Theories of EMR, Concept of Energy interactions in the atmosphere, energy Black body, atmospheric windows • types of remote sensing interactions with the earth surface features, Spectral reflectance of vegetation, Soil and water,	1	1
II	Platform, Orbit and sensor • Platform: Ground based, air-borne, space-borne, • Orbit: Geostationary satellite and polar orbiting satellite, Sensor: • Types of sensor and cameras, processes of sensor & its characteristics, Whiskbroom and Push broom cameras		
III	Techniques of interpretation • Aerial photo interpretation, satellite image interpretation, • Recognition elements: Tone, Color, Texture, Pattern, Shape, Size and associated features	1	1
IV	Aerial photography • Types, Geometry, Scale, Height and Process of Aerial Photograph, • basic requirement of Aerial Photograph, planning & execution of photographic flight, aerial cameras, relief displacement, • stereo vision, stereo model & stereoscope, parallax & parallax measurement		

References books

1. Campbell, J.B. (2002). *Introduction to remote sensing*, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
2. Curran Paul, J. (1984) Principles of Remote Sensing UK: ELBS.
3. Joseph, George (2007) Fundamentals of Remote Sensing Universities Press India
4. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2007). *Remote sensing and image interpretation*, 5th ed., Wiley. ISBN 0-471-15227-7.
5. Moffitt, F. H. (1980). Photogrammetry. 3rd Ed, Harper & Row, NY.
6. Sabins Floyd F Remote Sensing: Principles and Interpretation New York: WH Freeman and Company
7. Wolf, P. R. (1983). Elements of Photgrammetry. McGraw-Hill, NY.
8. Zorn, H. C. (1980). Introductory Course in Photogrammetry. 6th Ed. ITC, Netherlands.

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CORE
Course Title: Geostatistics
Course Code: PG.MGIS.C3
Credits: 04
Marks:100

Course objective
The course is designed to process geospatial data and use of statistics in the field of GIS. The course focuses on the development of the skills using statistical techniques in understanding, organizing, interpolation, analyzing and interpretation of geostatistical data and to develop the firm foundation to apply it in various fields.

Course Outcome
After completion of the course students will understand various types of datasets and applying different statistical techniques to different data sets. This will systematically access, analyze and evaluate information and ideas from multiple sources in order to identify underlying assumptions, and formulate conclusions. The course will enhance skills like solving quantitative problems and statistical queries.

Details of course contents and allotted credits

No	Topic	L	P
I	Introduction to Statistics • Statistical and Graphical foundation, data classification • Integrated approach, advantages and disadvantages. • Data type and structure. • 3D grid data geometry and association	1	1
II	Basic statistics • Measurement and summary, distribution, covariance and correlation, transformations, data analysis, display and sampling. • Prediction and interpolation : spatial interpolation, • Spectral analysis: linear sequences, Gilgai transect, power spectra and Caragabal transact(bandwidth and confidence interval)	1	1
III	Geostatistical uncertainty, probability and reliability • Data management for Geostatistics • Applications of Geostatistics		

Reference Books:

1 Simon W. Houlding, (2000) Practical Geostatistics: Modeling and Spatial Analysis, Springer, Berlin
2 Ricardo A. Olea (1999) Geostatistics for Engineers and Earth Scientist, Kluwer Academic Publishers, Boston
3 Richard Webstar and Margaret A. Oliver : Geostatistics for Environmental Scientists, Statistics in Practice (2nd ed) J. Wiley
4 Ott, T. and Swiaczny, F. (2001). Time-integrative GIS. Management and analysis of spatio-temporal data. Berlin / Heidelberg / New York: Springer.
5 Thurston, J., Poiker, T.K. and J. Patrick Moore. (2003). Integrated Geospatial Technologies: A Guide to GPS, GIS, and Data Logging. Hoboken, New Jersey: Wiley.
6 Roy, P.S. (2006). Geoinformatics for Tropical Ecosystems Bishen Singh Mahendra Pal Singh, Dehradun

ELECTIVE
Course Title: Digital Cartography
Course Code: PG.MGIS.E1
Credits: 04
Marks:100

Course objective
The course gives emphasis on the art, science, and technologies of cartography and Photogrammetry. It develops the user's ability to understand how maps are created traditionally and digitally. Representation and communicate spatial phenomena and their relationships through photogrammetric perspective which emphasis on skills like making of map, map reading signs and symbols etc..

Course outcome
Students will understand different types of projections and datum used in various locations. Proficiency and conceptual understanding in using Manual and computer techniques to carry out thematic maps and special purpose maps. Remote sensing, image processing and analysis through a series of laboratory exercises and reports

Details of course contents and allotted credits

No	Topic	L	P
I	Introduction to Cartography • Basics of Map • Fundamentals of direction, scale, types, sources • Elementary geodesy- Datum and Projection • Projection coordinates • WGS 84	1	1
II	Thematic Cartography Characteristics of geographical phenomena • Principles of colour perception • Colour scheme for Univariate choropleth and Isorithmic maps, proportional symbol mapping • Interpolation methods for smooth continuous phenomena symbolizing smooth continuous phenomena. Dot and asymmetric mapping		
III	Geographic representation • Map and mapping, map design, symbolization, conventional signs • map layout, map referencing and indexing, scale of maps and map contents • Field work techniques, socio – economic survey and attribute data.	1	1

Reference Books:

1. ESRI. 2004. ESRI Cartography: Capabilities and Trends. Redlands, CA. White Paper
2. Imus, D. and Dunlavey, P. 2002. Back to the Drawing Board: Cartography vs the Digital Workflow. MT. Hood, Oregon.
3. Kraak, Menno-Jan and Allan Brown (2001): Web Cartography – Developments and prospects, Taylor & Francis, New York, ISBN 0-7484-0869-X.
4. MacEachren, A.M. (1994). Some Truth with Maps: A Primer on Symbolization & Design. University Park: The Pennsylvania State University. ISBN.
5. Monmonier, Mark (1991). How to Lie with Maps. Chicago: University of Chicago Press. ISBN 0-226-53421-9.
6. Monmonier, Mark (1993). Mapping It Out. Chicago: University of Chicago Press. ISBN.

7. Pickles, John (2003). A History of Spaces: Cartographic Reason, Mapping, and the Geo-Coded World. Taylor & Francis. ISBN 0-415-14497-3

8. Sircar, D.C.C. (January 1990). Studies in the Geography of Ancient and Medieval India. Motilal Banarsidass Publishers. ISBN 8120806905.

9. Slocum, T. (2003). Thematic Cartography and Geographic Visualization. Upper Saddle River, New Jersey: Prentice Hall. ISBN 0-130-35123-7. Wilford, John Noble (2000). The Mapmakers. Vintage Books. ISBN 0-375-70850-2.

10. Terry A. Slocum (1999): Thematic Cartography and Visualization, Prentice Hall, New Jersey

9. MJ Kraak, F Ormeling - 2003 - Cartography: visualization of geospatial data Addison-Wesley Longman Ltd

10. Burnside, C. D. (1985). Mapping from Aerial Photography. 2nd Ed, Collins.

11. Campbell, J.B. (2002). *Introduction to remote sensing*, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.

12. Curran Paul, J. (1984) Principles of Remote Sensing UK: ELBS.

13. Joseph, George (2007) Fundamentals of Remote Sensing Universities Press India

14. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2007). *Remote sensing and image interpretation*, 5th ed., Wiley. ISBN 0-471-15227-7.

15. Moffitt, F. H. (1980). Photogrammetry. 3rd Ed, Harper & Row, NY.

16. Sabins Floyd F Remote Sensing: Principles and Interpretation New York: WH Freeman and Company

17. Wolf, P. R. (1983). Elements of Photgrammetry. McGraw-Hill, NY.

18. Zorn, H. C. (1980). Introductory Course in Photogrammetry. 6th Ed. ITC, Netherlands.

ELECTIVE
Course Title: Principles of Computer and Programming
Course Code: PG.MGIS.E2
Credits: 04
Marks: 100

Course objective
The course will explore the Application of computer in the field of GIS, DBMS and programming for GIS customization. The main focus is on introduction to computers-DBMS, basics of programming languages.

Course outcome
Students will demonstrate proficiency and conceptual understanding in data creation and storage, languages or manuscripts techniques to carry out geographical data for developing and designing application and use of Programming in GIS.

Details of course contents and allotted time

No	Topic	L	P
I	Introduction to Computers • Hardware and Software, System requirement, configuration and operating systems and Computer Applications • Algorithms and Programming in Computers • MS ACCESS and applications	1	1
II	Introduction to simple programming in C • Developing programming techniques and solutions for spatial algorithms and problem-solving using VB • Getting started with HTML, flash	1	1
III	Introduction to Python		

Reference Books:
1. Benjamin C. Pierce (2002). Types and Programming Languages, The MIT Press.
2. Bruce J. MacLennan (1999). Principles of Programming Languages: Design, Evaluation, and Implementation, Oxford University Press.
3. Daniel P. Friedman and Mitchell Wand (2001). Christopher Thomas Haynes: Essentials of Programming Languages, The MIT Press.
4. David Gelernter and Suresh Jagannathan (1990). Programming Linguistics, The MIT Press.
5. Goldschlager, L. (1998). A Lister Computer Science - a modern Introduction Prentice Hall, 1988.
6. John C. Mitchell (2002). Concepts in Programming Languages, Cambridge University Press.
7. Michael L. Scott (2005). Programming Language Pragmatics, Morgan Kaufmann Publishers.
8. Ravi Sethi (1996). Programming Languages: Concepts and Constructs, 2nd ed., Addison-Wesley.
9. James S. McKeown (2010), Programming in Visual Basic 2010: The Very Beginner's Guide
10. Richard Mansfield (2003), Visual Basic .NET All in One Desk Reference for Dummies

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SEMESTER II
CORE
Course Title: Spatial Analysis and Modeling
Course Code: PG.MGIS.C4
Credits: 04
Marks:100

Course objective
The course focuses on fundamental aspects of spatial data modeling specifically on the aspect of two dimensional and three-dimensional (3D) modeling, structuring of raster and vector analysis and its types. It also looks into integration of non-spatial data and its application.

Course outcome
Student will able to apply spatial tool and techniques in spatial datasets for carry out Surface and 3d analysis. Students will demonstrate proficiency and conceptual understanding spatial model making process.

Details of course contents and allotted credits

No	Topic	L	P
I	Introduction to analysis. • Significance of spatial analysis, overview of tools for analysis Spatial analysis of Vector Base • Overlay operations: point in polygon, line polygon, polygon in polygon, Single layer operations, features identification, extraction, classification and manipulation, Multilayer operations: union, Intersection, difference Spatial analysis of raster base • Map algebra, grid based operations, local, focal, zonal and global functions, cost surface analysis, optimal path and proximity search.	1	1
II	Analysis • Network Analysis- Concept of network analysis, Types of network analysis, Evaluation of network complexity using Alpha, Gama indices, Network data model • Point pattern- Method for evaluating point patterns, Clustered and random distribution • Surface analysis- Interpolation method, DEM, TIN, variance filter, slope and aspect, relief and hill shading	1	1
III	Spatial modeling • Role of spatial model, explanative, predictive and normative models, handling complex spatial query, case studies.		

Reference Books:

1. Alias A. Rahman and Morakot Pilouk (2008)Spatial Data Modeling for 3D GIS, Springer New York
2. Longley, P.A., Goodchild, M.F., Maguire, D.J. and Rhind, D.W. (2005). Geographic Information Systems and Science. Chichester: Wiley. 2nd edition.
3. Ott, T. and Swiaczny, F. (2001). Time-integrative GIS. Management and analysis of spatio-temporal data. Berlin / Heidelberg / New York: Springer.
4. Thurston, J., Poiker, T.K. and J. Patrick Moore. (2003). Integrated Geospatial Technologies: A Guide to GPS, GIS, and Data Logging. Hoboken, New Jersey: Wiley.
5. M Goodrich (2000). Data Structures and Algorithms in Java, 2nd Edition Wiley.
6. Malczewski, J. (1999). GIS and Multi-criteria Decision Analysis. New York: John Wiley and Sons
7. GIS and Multi-criteria Analysis by Makrewski Jacek, USA, 1999.
8. Principals of GIS by Burrough P.A. MacDonneli R.A. published by Oxford University Press, 2000.
9. Geographical Information Science, vol. I by Roy P.S. Published by IIRS, 2000.
10. Fundamentals of Geographic Information Systems, 2nd Edition by Demers M.N. published by John Wiley & Sons 2000

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CORE
Course Title: Advanced Remote Sensing and GIS
Course Code: PG.MGIS.C5
Credits: 04
Marks:100

Course objective

The course will provide latest state of art in remote sensing and GIS technology. It will provide an opportunity to understand and work with latest developments remote sensing data base and GIS technology.

Course outcome

Students will be able to apply mathematical relationships (at a pre-calculus level) describing fundamental physical, geometric, and computational principles relevant to remote sensing and GIS. They will create Remote sensing application

Details of course contents and allotted credits

No	Topic	L	P
I	Advanced Remote Sensing • Microwave Remote Sensing • Thermal Remote Sensing • Hyper spectral Remote Sensing • LiDAR & Drone	1	1
II	Advancement in GIS • Participatory GIS and Mobile GIS • WebGIS (ArcIMS, MapServer, Geomedia, MapGuide • GIS servers, Intermediate software and Distributed GIS systems	1	1
III	Multi-criteria decision making analysis – • Ranking • Rating • Pair wise comparison Fuzzy logic		

Reference Books:

1. Asrar Ghassem (2004) Theory and applications of optical remote sensing NewYork: John Wiley
2. Berry, J.K. (1993) Beyond Mapping: Concepts, Algorithms and Issues in GIS. Fort Collins, CO: GIS World Books.
3. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2003). Remote sensing and image interpretation, 5th ed., Wiley. ISBN 0-471-15227-7.
4. Malczewski, J. (*1999).* GIS and Multicriteria Decision Analysis. New York: John Wiley and Sons
5. Mitchel, Tyler (2005): WebMapping Illustrated, O'Reilly, Sebastopol, 350 pages, ISBN 0-569-00865-1. This book discusses various Open Source WebMapping projects and provides hints and tricks as well as examples.
6. Ott, T. and Swiaczny, F. (2001) Time-integrative GIS. Management and analysis of spatio-temporal data, Berlin / Heidelberg / New York: Springer.
7. Peterson, Michael P. (ed.) (2003): Maps and the Internet, Elsevier, ISBN 0-08-044201-3.
8. Skolnik, Merrill I. (2001). Introduction to Radar Systems, McGraw-Hill (1st ed., 1962; 2nd ed., 1980; 3rd ed.), ISBN 0-07-066572-9.
9. Thurston, J., Poiker, T.K. and J. Patrick Moore. (2003) Integrated Geospatial Technologies: A Guide to GPS, GIS, and Data Logging. Hoboken, New Jersey: Wiley.
10. Worboys, Michael, & Matt Duckham (2004) GIS: a computing perspective. Boca Raton: CRC Press.

ELECTIVE
Course Title: Digital Image Processing
Course Code: PG.MGIS.E3
Credits: 04
Marks:100

Course objective
This course will introduce fundamental technologies of digital image processing i.e. compression, information extraction and analysis. Students will also gain understanding of algorithm, analytical tools, and practical implementations of various digital image applications.

Course outcome
Students will demonstrate proficiency and conceptual understanding in using software or manual techniques which will prove how digital technology has come over traditional technology to carry out remote sensing image processing and analysis through a series of laboratory exercises and reports

Details of course contents and allotted credits

No	Topic	L	P
I	Introduction to Digital Image Processing • Visual perception, Image sensing and acquisition, • Digital Data Formats Image sampling and Quantization • Basic relationship between pixels. • Development, scope and fundamental steps involved in Digital Image Processing, components of Image Processing	1	1
II	Image Rectification • Radiometric and Atmospheric Correction • Geometric Correction, Ortho-rectification, calibration and rectification of photo and images, • Image enhancement in spatial domain and frequency domain, Filtering, Fourier Transform, Noise removal	1	1
III	Multispectral Image Processing • Colour Image processing, slicing, Image compression, dilation, Segmentation, Spectral rationing, density slicing and image fusion • Object recognition, classification, object recognition, feature extraction, accuracy, assessment, change detection Accuracy Assessment and integration with GIS		

Reference Books:
1. Burger, Wilhelm; Mark J. Burge (2007). Digital Image Processing: An Algorithmic Approach Using Java. Springer. ISBN 1846283795.
2. Campbell, J.B. (2002). Introduction to remote sensing, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
3. Damen MCJ, Sicco Smith G and Kerstappen(Ed) (). Remote Sensing for Resources Development and Environmental Management 3rd.volume Set Netherlands: Balkema
4. Gonzalez, Rafael C.; Richard E. Woods (1992). Digital Image Processing. ISBN 0-201-50803-6.
5. Jensen John R (2007). Introductory Digital Image processing: Remote Sensing Perspective New Jersey: Prentice Hall
6. Joseph, George (2007). Fundamentals of Remote Sensing Universities Press India
7. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2007). Remote sensing and image interpretation, 5th ed., Wiley. ISBN 0-471-15227-7.
8. Pratt, William K. (1978). Digital Image Processing. ISBN 0-471-01888-0.
9. Romeny, Bart M. (2003). Front-End Vision and Multi-Scale Image Analysis. ISBN1-4020-1507-0.
10. Umbaugh, Scott E (2005). Computer Imaging: Digital Image Analysis and Processing. ISBN 0-84-932919-1

PARVATIBAI CHOWGULE COLLEGE OF ARTS AND SCIENCE
M.Sc in Geoinformatics

ELECTIVE
Course Title: Programming and Customization
Course Code: PG.MGIS.E4
Credits: 04
Marks:100

Course objective
The course is designed to develop programming skills using a spatial data to automate the analysis process. This includes the programming workflow in spatial domain, python for application and various scripting languages.

Course outcome
Student will develop new tools and software also customizes open source software. They design and built web base platform for geospatial database.

Details of course contents and allotted credits

No	Topic	L	P
	Using raster data Generating cell size obtaining with width and height of raster Counting raster band and swapping raster bands querying ,creating ,raster based analysis	1	1
I.	Dynamic maps Map canvas, map units, iterating over layers, graduated layer symbol renderer ,map, book mark SVG for layer symbol, map layer transparency ,mouse coordinate tracking tool, composing static map analysis data using algorithm		

Reference Books:

1   Kang-Tsung Chang, Programming ArcObjects with VBA: a task-oriented approach, 2, illustrated, CRC Press, 2007, ISBN 0849392837, 9780849392832
2   Robert Burke (2003) ,Getting to know ArcObjects, programming ArcGIS with VBA, Esri Pr,ISBN-10: 158948018X,ISBN-13: 9781589480186
3   Rick Leinecker, Vanessa L. Williams,Visual Studio 2008 All-In-One Desk ,For Dummies 2008, ISBN0 470191082, 9780470191088
4   Bruce Ralston,Developing GIS Solutions With MapObjects and Visual Basic, OnWord Press; 1 edition (October 31, 2001), ISBN-10: 0766854388 ,ISBN-13: 978-766854383
5   Swaroop CH, A Byte of Python
6   John Walkenbach, Excel VBA Programming or Dummies
7   John Zelle (2010), Python Programming
8   Michael Dawson (2010), Python Programming for the Absolute Beginner, 3rd Edition
9   Zhi Jun Lio, David Percy, Larry V Stanislawski. GIS Programming: Concepts and Applications

ELECTIVE
Course Title: Field Techniques and Report Writing
Course Code: PG.MGIS.E5
Credits: 04
Marks:100

Course objective
The course is designed to develop field and Survey techniques using different survey instruments and Interpretation of toposheets and maps. This includes field techniques and importance of field survey in GIS.

Course outcome
Students will describe a survey method and different instruments and it's assemble and summarize relevant survey for relevant work which will skill development in using different instruments. Report writing and Interpretation of Maps will focus on writing skills.

Details of course contents and allotted time

No.	Topic	L	P
I	Introduction to Field Survey • Importance of field instrument survey - scope and purpose, principles and application of selected survey instruments.	1	1
II	Chain and Plane Table Survey • Chain survey: use of tapes-open traverse, triangulation survey; Plane table; plan preparation, • resection -one point and two point problem; three • Point problem; tracing paper method.		
III	Dumpy level, Auto level and Theodolite Survey • Dumpy level: traverse survey, contour plan preparation. Theodolite - horizontal, land vertical (height) measures, accessible and inaccessible method.	1	1
IV	Village Survey and Report writing • Fundamentals of Village survey, prerequisites of village survey, preparation of questionnaires, data entry, basic analysis in Microsoft excel • Interpretation of surveyed maps and Report writing.	1	1

References:
1. Clendinning , J. Principles and use of Surveying Instruments. 2nd edition, Blockie. A 1958.
2. Clendinning ,J Principles of surveying 2nd edition 1960.
3. Hotine, Major M. The re-triangulation of Great Britain. Empire survey review 1935.
4. Mitra,R.P. and Ramesh A : Fundamentals of Cartography Revised Edition, Concept Publication, New Delhi.
5. Monkhouse - Maps and diagrams Methuen 1971.
6. Negi, Balbir Singh. Practical Geography Third revised Ed. Kedar Nath and Ram Nath, Meerut &Delhi, 1994-95.
7. Sandover,J.A. Plane Surveying. Arnold 1961.
8. Singh & Karanjta - Map work and Practical Geography Central Book Dept Allahabad 1972.
9. Singh, R.L.and Dutt, P.K. Elements of Practical Geography, Students Friends, Allahabad.1968.