KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA
(A State Public University)

Chhatrapati Shivaji College, Satara
(A Constituent College)

Faculty of Science & Technology

Syllabus for

M. A./M.Sc. Degree Programme in Geography

M.A/M.Sc. Part-II

Structure and Syllabus in Accordance with
National Education Policy (NEP) 2020

Choice Based Credit System (CBCS)
With Multiple Entry and Multiple Exit Options

To be implemented from June, 2024 onwards

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA

Rayat Shikshan Sanstha's

Chhatrapati Shivaji College, Satara

(A Constituent College)

M.A. / M.Sc. Part-II Geography

TITLE AND SUBJECT CODE

(w.e.f. June, 2024 onwards)

Sr. No.	Semester	Name of the Course	Subject Code	Discipline Specific Elective
Major Mandatory				
01	III	Fundamentals of GIS and Introduction to GPS Paper-VII	MMGEO05309	Geography Course-13
02	III	Fundamentals of Remote Sensing & Digital Image Processing P-VIII	MMGEO05310	Geography Course-14
03	III	Practical in Digital Image Processing Practical -V	MMGEO05311	Geography Course-15
04	III	Practical in Photogrammetry P-VI	MMGEO05312	Geography Course-16
Major Electives				
05	III	Bio-Geography- A OR Settlement Geography	MEGEO05303	Geography Course-17
Research Project				
06	III	Research Project	RPGEO05301	Geography Course-18
Major Mandatory				
7	IV	Development of Modern Geographical thought	MMGEO05413	Geography Course-19
8	IV	Geohydrology & Oceanography	MMGEO05414	Geography Course-20
9	IV	Introduction to GIS Software & GPS Survey	MMGEO05415	Geography Course-21
Major Electives				
11	IV	Agricultural Geography-A OR Regional Planning & Development -B	MEGEO05404	Geography Course-22
12	IV	Research Project	RPGEO05402	Geography Course-23

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M.A./M.Sc. Part-II Geography

Course Structure

(w.e.f. June, 2024 onwards)

Sem.	Title of the Paper	Discipline Specific Elective	Distribution of Credit	Work Load Per week	Total Credit	ESE	CCE	Total Marks
III	Fundamentals of GIS and Introduction to GPS	Geography Course-13	4	4 Lectures	22	60	40	100
III	Fundamentals of Remote Sensing & Digital Image Processing	Geography Course-14	4	4 Lectures		60	40	100
III	Practical in Digital Image Processing Practical	Geography Course-15	4	8 Lectures		60	40	100
III	Practical in Photogrammetry	Geography Course-16	2	4 Lectures		30	20	50
III	Bio-Geography- A OR Settlement Geography	Geography Course-17	4	4 Lectures		60	40	100
III	Research Project	Geography Course-18	4	4 Lectures		60	40	100
IV	Development of Modern Geographical thought	Geography Course-19	4	4 Lectures	22	60	40	100
IV	Geohydrology & Oceanography	Geography Course-20	4	4 Lectures		60	40	100
IV	Introduction to GIS Software & GPS Survey	Geography Course-21	4	8 Lectures		60	40	100
IV	Agricultural Geography OR Regional Planning & Development	Geography Course-22	4	4 Lectures		30	20	50
IV	Research Project	Geography Course-23	6	6 Lectures		90	60	150

ESE=End Semester Examination CCE= Continuous Comprehensive Examination

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Syllabus for

M.A./M.Sc. Part II: Semester-III

(w.e.f. June, 2024 onwards)

Fundamentals of GIS And Introduction to GPS

Course Code: MMGEO05309 **Credits: 04**

Preamble

Geospatial Technology is an emerging field of study that includes Geographic Information System (GIS), Remote Sensing (RS) and Global Positioning System (GPS). These techniques are useful to improve decision-making. These decisions are made easier because of specific and detailed information is presented about one or more locations. Geospatial technology enables us to acquire data, i.e., referenced to the earth and use it for analysis, modeling, simulations and visualization. These tools reduce costs and increase efficiency – especially regarding maintenance schedules, fleet movements or scheduling timetables.

Course Objectives: Enable the student-

1. To introduce the concept of Geographic information System.
2. To categorize GIS Analysis.
3. To understand GNSS Integration.
4. To understand the application of geospatial technology in various geographic fields.
5.

Course Outcome: After studying the course, the student will able to …

CO1. Explain the basic concept of geospatial technology.
CO2. Categorize the GIS analysis.
CO3. Use of GNSS.
CO4. Apply geospatial technology in various geographic fields.

Expected Skills impartation (Through theory and practical)

- Map reading skills
- Analytical & Problem-solving skills
- Comprehension skills
- Technical skills

Module No.	Title & Content	Credit	Hours	COs
I	**Introduction to GIS** 1.1 Definition of GIS, History and development of GIS, Components of GIS 1.2 Types of Geographic data; Spatial and Non-Spatial data; Raster and Vector data model 1.3 Spatial data input: Digitization and Conversion; Spatial Features: Point, line and polygon; Concept of Arc, Node and Vertices. 1.4 Digitization errors; Topology and Topological relationship	1	15	1
II	**GIS Analysis** 2.1 Spatial analysis: Overlay and Buffer Analysis, Interpolation techniques in GIS 2.2 Terrain analysis: DEM: DTM and DSM. 2.3 Analysis of non-spatial data. 2.4 Database Management system (DBMS)	1	15	2
III	**Global Navigation Satellite System** 3.1 Introduction and History of GNSS 3.2 GPS satellite; Working principle of GPS; Source of GPS errors 3.3 Differential GPS (DGPS); GNSS & GIS Integration 3.4 Types of GNSS	1	15	3
IV	**Applications of Geospatial Technology** 4.1 Geospatial Technology in Urban and regional planning, Agricultural Management 4.2 Forestry and Environment, Land use/ and Land cover mapping, 4.3 Landform analysis, Disaster Management 4.4 Application in Navigation Mapping. Quick Response System	1	15	4

Practical work: Case Study / Field Survey / Field Visit / Project:

1.Visit to GIS industry/institute

2.Hands on training: GIS software/GPS hand set

3.Conversion of Degree Minute Second to Degree Decimal and vice versa Over view of IRNSS/ NAVIC

4.Application of Geospatial technology (Anyone)

Reference Book:

- Bernhardensen, Tor. 1999. Geographic Information Systems: An Introduction Toronto: John Wiley & Sons, Inc.
- Bishop, Michael P. and Shroder, John F. (Eds.) 2004. Geographic Information Science and Mountain Geomorphology. Chichester, U.K.: Praxis Publishing (Springer).11
- Burrough, PeterA. And McDonnell, RachaelA. 1998. Principles of Geographical Information Systems–Spatial Information Systems and Geo-statistics. Oxford University Press.
- Butten field, B. P. and R. P. McMaster 1991. Map Generalization: Making Rules for Knowledge Presentation. New York: Wiley.
- Chang, Kang tsung. 2002. Introduction to Geographic Information Systems. New Delhi: Tata McGraw-Hill, Publishing Company Limited.
- Chrisman, N. 1997. Exploring Geographic Information Systems. New York: John Wiley & Sons, Inc.
- Chrisman, N. 1998. "Academic Origins of GIS," In T. Foresman (Ed): The History of Geographic Information Systems. Upper Saddle River, NJ: Prentice Hall, pp.33-43.
- DeMers, Michael N. 2000. Fundamentals of Geographic Information Systems (2nd Ed.) (Wiley Student Edition). New York: John Wiley & Sons, Inc.
- Foresman, T. (Ed.) 1998.The History of Geographic Information Systems Perspectives from the Pioneers. Upper Saddle River, NJ: Prentice Hall.
- Gregory, D.1978. Ideology, Science and Human Geography. New York: St. Martin's Press.
- Heywood, Ian; Cornelius, Saiah; and Carver, Steve. 2000. An Introduction to Geographical Information Systems (Pearson Education Asia Low Priced Edit ion). Longman.
- Kraak, Menno-Jan and Ormeling, Ferjan. 2004. Cartography - Visualization of Geospatial Data (2nd Ed.) (Pearson Education Low Price Edition). Pearson Education.
- 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.
- 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.
- Monmonier, M. 1996. How to lie with Maps? Chicago: University of Chicago Press.
- Pickles, J. 1997. "Tool or Science? GIS, Technoscience, and Theoretical Turn." Annals of the Association of American Geographers, vol. 87, pp. 363-372.
- 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.
- 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.
- Schuurman, Nadine. 2004. GIS-A Short Introduction. Blackwell Publishing.
- 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.

Journals:

1. International Journal of Geographical Information Science (IJGIS)
2. Journal of Spatial Information Science (JSIS)
3. GPS Solutions
4. Journal of Geographical Systems
5. Journal of Global Positioning Systems (JGPS)

Additional Reading:

1. "Geographic Information Systems and Science" by Paul A. Longley, Michael F. Goodchild, David J. Maguire, and David W. Rhind.
2. "GIS Fundamentals: A First Text on Geographic Information Systems" by Paul Bolstad.
3. "Understanding GPS: Principles and Applications" by Elliott D. Kaplan and Christopher J. Hegarty.
4. "The Global Positioning System and GIS" edited by Michael Kennedy and Francis Harvey.
5. "Introduction to Geographic Information Systems" by Kang-Tsung Chang.

Medium of Instruction: English

Library and Equipment:

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Syllabus for

M.A./M.Sc. Part II: Semester-III

(w.e.f. June, 2024 onwards)

Fundamentals of Remote Sensing and Digital Image Processing

Course Code: MMGEO05310 **Credits: 04**

Preamble:

Remote Sensing is an emerging field highly supports to makes available the recent and past earth's features data. This data is useful in different fields such as; geography, Environment, agriculture, regional planning, oceanic study and disaster management etc. This paper gives a general overview of the fundamental mechanism of Satellite remote sensing, aerial photography and digital image processing. The remotely sensed data and digital image processing enhances the capabilities of users to portray the dynamic changes of earth surface. It is helpful to researchers, civilian and decision makers for different purposes. This technique reduces the costs, time and efforts of data acquisition and increases efficiency. Technical study of remote sensing and digital image processing will be beneficial to increase the interest of this specific subject among the students, researchers as well as among the faculties.

Course objective: Enable the student-

1. To introduce the student to a solid foundation in the principles, techniques, and applications of remote sensing and digital image processing.
2. To understanding of the principles, techniques, and applications of aerial photography and Photogrammetry.
3. To provide exposure to students for use of remote techniques for day-to-day life.
4. To acquire skills in advance techniques for planning, research and development.
5. To update on current trends and advancements in remote sensing technology and methodologies.

Course Outcomes:

CO1- Explain fundamental and principles of Remote Sensing and Aerial Photography

CO2- Understand the basic difference between various kinds of satellites and sensors

CO3- Understand the process of digital image processing.

CO4- Know the application of Remote Sensing in various fields.

Expected Skills impartation (Through theory and practical`s)

1. Comprehensive Understanding of Remote Sensing and Aerial Photography

2. Proficiency in Remote Sensing Technologies
3. Remotely Sensed data analysis and interpretation
4. Digital image processing
5. Awareness of Current Trends in satellite remote sensing.

Module No.	Title & Content	Credit	Hours	COs
I	**Fundamental of Remote Sensing** 1.1 Definition, Scope, History and Development of Remote Sensing 1.2 Electromagnetic Radiation (EMR) and Spectrum 1.3 EMR interaction with Atmosphere and Earth surface, Atmospheric window and Blackbody 1.4 Platforms and Resolution	1	15	1,4
II	**Fundamental of Aerial Photography** 2.1 Introduction to Aerial Photography and Photogrammetry 2.2 Geometry of Aerial Photographs 2.3 Types of Photos, Films and Camera 2.4 Application of Aerial Photography	1	15	1,4
III	**Satellite Remote Sensing** 3.1 Satellite: types and their characteristics 3.2 Orbital characteristics of Remote sensing satellite LANDSAT, SPOT, IRS, Sentinel & Quickbird 3.3 Applications of optical, thermal & microwave remote sensing. 3.4 Remote Sensing Scenario in Indian Context	1	15	2,4
IV	**Digital Image Processing** 4.1 Introduction to digital image processing 4.2 Source of Errors 4.3 Image Enhancement Techniques 4.4 Types of Digital Image Classification	1	15	3, 4

Practical work: Case Study / Field Survey / Field Visit / Project:

1. Visually identify various earth features using satellite images
2. Show the bands of Satellite Images
3. Give brief information of satellite launching vehicles

Reference Book:

- George, J. (2017): Fundamental of Remote Sensing, University Press (India) Pvt. Ltd, Orient Longman Pte. Ltd., Hyderabad, India
- Jensen J.R. (2005): Digital Image Processing: A Remote Sensing Perspective, 3rd ed., Prentice Hall.
- Jenson R. Jhon, (2003): Remote Sensing of the Environment-An Earth Resource Perspective, Pearson Education Pvt. Ltd., Indian Branch, Patparganj, Delhi, India.
- John R.J. (2000): Introductory Digital Image Processing Remote Sensing Perspective, New Jerysey, Prentice Hall.
- Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. (2007): "Remote Sensing and Image Interpretation", 6th Edition, John Wiley and Sons, New York
- Michel K. and Yves E. (2001): Digital Photogrammetry, , Taylor & Francis
- Narayanan, LRA, (1999): Remote sensing and its Applications, Universities Press (India) Ltd., Hyderabad.
- Panda, B.C. (2005): Remote Sensing – Principles and Applications. New Delhi: Viva Books Private Limited.
- Rampal, K.K. (1999): Handbook of Aerial Photography and Interpretation. New Delhi: Concept Publishing Company.
- Reddy, M.A. (2006): Textbook of Remote Sensing and Geographical Information Systems Hyderabad: B.S. Publications.
- Sabins, F.F. Jr, (1987): Remote Sensing; Principles and Interpretation, W.h. Freeman & Co., New York.
- Wolf P., DeWitt B. (2000): Elements of Photogrammetry with Applications in GIS (3rd Ed.) McGraw-Hill

Journals:

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

Websites:

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

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Syllabus for

M.A. / M.Sc. Part II: Semester-III

(w.e.f. June, 2024 onwards)

Practical In Digital Image Processing

Course Code: MMGEO05311 **Credits: 04**

Preamble:

Satellite Remote Sensing and Photogrammetry is widely used in the different fields. The practical knowledge of this field is requiring handling, analyzing and interpreting the data. A hand on practical of aerial photos and satellite images gives the basic and advanced practical knowledge to the students. The practical knowledge and technical skills of this field will be providing the understanding of Photogrammetry, Remote Sensing and Digital Image Processing and their various applications.

Course objective: This course is designed to fulfill the following objectives…

1. To equip students with the knowledge and skills needed to understand and utilize remote sensing data for various practical applications.
2. To learn about the sources of remote sensing data and how to access them.
3. To understand the basics of digital image processing, including image enhancement, classification, and transformation.
4. To gain practical experience through hands-on exercises and projects using remote sensing software.
5. To explore new developments and emerging applications of remote sensing
6. To develop skills in interpreting remote sensing images for various applications for planning, research and development.

Course Outcomes:

CO1- Basics of aerial photogrammetry.

CO2- Procurement of satellite data from online sources.

CO3- Visual interpretation of Satellite imageries and Aerial photographs.

CO4- Practical knowledge of digital image processing.

Expected Skills impartation (Through theory and practical`s)

1. Handling of remotely sensed data
2. Data Acquisition Skills and Effective visual interpretation
3. Skill of enhancement and processing of digital imageries
4. Image Interpretation abilities and Digital Image Processing Competence

Module No.	Title & Content	Credit	Hours	COs

I	**Practical in Satellite Image** 1.1 Study of satellite image browsing sites 1.2 Elements of image interpretation 1.3 Visual interpretation of satellite images (True Color/ FCC/Thermal)	1	30	1, 2
II	**Digital Image Processing** 2.1 Introduction to DIP software 2.2 Loading and Layer stacking of image data 2.3 Rectification and correction of image data 2.4 Image Enhancement	1	30	3,4
III	**Digital Image Classification** 3.1 Supervised image classification. 3.2 Unsupervised image classification. 3.3 Vegetation component analysis	1	30	3
IV	**Accuracy Analysis and Map Presentation** 1.1 Accuracy Analysis: Producer, User Accuracy, Overall and Mapping Accuracy, Kappa Coefficient 1.2 Generation of Vector Layer 1.3 Presentation: Map composition	1	30	3

Practical work: Case Study / Field Survey / Field Visits / Project

1. Comparative study of true colour and false colour composite images
2. Compare the area between Satellite image and Google Earth imagery
3. Field visit for ground truth

Reference Book:

- Averte and GL. Berrin (2001) Fundamentals of Remote Sensing and Aerial Photo interpretation, Mc Millan, New York.
- Drury S.A, 1990: A Guide to Remote Sensing - Interpreting Images of Earth, Oxford Science Publications, Oxford.
- George, J. (2017), Fundamental of Remote Sensing, University Press (India) Pvt. Ltd, Orient Longman Pte. Ltd., Hyderabad, India
- Jensen J.R. (2005) Digital Image Processing: A Remote Sensing Perspective, 3rd ed., Prentice Hall.
- John R.J. (2000). Introductory Digital Image Processing: Remote Sensing Perspective, New Jerysey, Prentice Hall.
- Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. (2007): "Remote Sensing and Image Interpretation", 6th Edition, John Wiley and Sons, New York
- Narayanan, LRA, (1999) Remote sensing and its Applications, Universities Press (India) Ltd., Hyderabad.
- Panda, B.C. (2005). Remote Sensing – Principles and Applications. New Delhi: Viva Books Private Limited.
- Reddy, M.A. (2006). Textbook of Remote Sensing and Geographical Information Systems. Hyderabad: B.S. Publications.

- Sabins F.F Jr.(1987). Remote Sensing: Principles and Interpretation, W.H.Freeman& Co., New York.
- Singh and Sharma (2004) Introduction of Remote Sensing, Rawath Publications, New Delhi

Journals:

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

Websites:

1. Bhuvan: http://www.bhuvan.nrsc.gov.in
2. Indian Space Research Organisation (ISRO), India: http://www.isro.org
3. International Society for Photogrammetry and Remote Sensing (ISPRS): http://www.isprs.org
4. National Remote Sensing Centre (NRSC), India: http://www.nrsc.gov.in

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Syllabus for

M.A./M.Sc. Part II: Semester-III

(w.e.f. June, 2024 onwards)

Practical In Photogrammetry

Course Code: MMGEO05312 **Credits: 02**

Preamble:

Satellite Remote Sensing and Photogrammetry is widely used in the different fields. The practical knowledge of this field is requiring handling, analyzing and interpreting the data. A hand on practical of aerial photos and satellite images gives the basic and advanced practical knowledge to the students. The practical knowledge and technical skills of this field will be providing the understanding of Photogrammetry, Remote Sensing and Digital Image Processing and their various applications.

Course objective: This course is designed to fulfil the following objectives

1. To introduce the student to the principles, techniques, and applications of aerial photography and Photogrammetry.
2. To experience through hands-on exercises and projects using aerial photography and photogrammetry software.
3. To provide exposure to the students for use of aerial data for planning, research and development.
4. To update the current trends and advancements in aerial photography.

Course Outcomes:

CO1- Basics of aerial Photogrammetry.

CO2- Visual interpretation of Aerial Photographs.

CO3- Procurement of DEM data from online sources

CO4-. Explore new developments and emerging applications in the

Expected Skills impartation (Through theory and practical`s)

1. Comprehensive understanding and proficiency of Aerial Photography and Photogrammetry
2. Flight Planning and Execution Skills
3. Effective visual interpretation
4. 3D Modeling and Mapping Skills
5. Awareness of Current Trends

Module No.	Title & Content	Credit	Hours	COs
I	**Practical in Photogrammetry**	1	30	1,2

	1.1 Calculation of Photo scale, Focal length and Flying height. 1.2 Calculation of Relief Displacement and Object height determination 1.3 Parallax and Object height determination 1.4 Area Calculation and Flight Planning			
II	**Practical in Aerial Photo and Digital Photogrammetry** 2.1 Marginal information of Aerial Photographs 2.2 Stereoscopy and Orientation & construction of 3-D model under stereoscope 2.3 Interpretation of Aerial Photograph 2.4 DEM Data generation and Application of UAV	1	30	3,4

Practical work: Case Study / Field Survey / Field Visits / Project

1. Comparative study of true colour and false colour composite images
2. Flight planning for your own village
3. Compare the area between satellite image and Google Earth imagery
4. Field visit for ground truth

Reference Books:

- Averte and GL. Berrin (2001): Fundamentals of Remote Sensing and Aerial Photo interpretation, Mc Millan, New York.
- Digital Elevation Model Technologies and Applications: The DEM user Manual,
- Leica Photogrammetry Suite – Orthobase and Orthobase Pro User Guide, Leica Geosystems, GIS & Mapping, Atlanta, USA, 2003.
- Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. (2007): "Remote Sensing and Image Interpretation", 6th Edition, John Wiley and Sons, New York
- Michel K. and Yves E. (2001): Digital Photogrammetry, , Taylor & Francis
- Narayanan, LRA, (1999) :Remote sensing and its Applications, Universities Press (India) Ltd., Hyderabad.
- Panda, B.C. (2005): Remote Sensing – Principles and Applications. New Delhi: Viva Books Private Limited.
- Paul R. Wolf (1999): Elements of Photogrammetry, Mc. Grawhill, International Book Company, New Delhi
- Rampal, K.K. (1999): Handbook of Aerial Photography and Interpretation. New Delhi: Concept Publishing Company.
- Reddy, M.A. (2006): Textbook of Remote Sensing and Geographical Information Systems. Hyderabad: B.S. Publications.
- Sabins F. F Jr. (1987): Remote Sensing: Principles and Interpretation, W.H.Freeman& Co., New York.

- Singh and Sharma (2004): Introduction of Remote Sensing, Rawath Publications, New Delhi
- Wolf P., DeWitt B., (2000): Elements of Photogrammetry with Applications in GIS (3rd

Journals:

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

Websites:

1. Bhuvan: http://www.bhuvan.nrsc.gov.in
2. International Society for Photogrammetry and Remote Sensing (ISPRS): http://www.isprs.org
3. National Aeronautics and Space Administration (NASA), USA: http://www.nasa.gov

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Syllabus for

M.A./M.Sc. Part II: Semester-III

(w.e.f. June, 2024 onwards)

Biogeography -A

Course Code: MEGEO05303 **Credits: 04**

Preamble:

Study of Biogeography is become a mandatory part in structure of the education programmes. Biogeography is important as a branch of Physical Geography that sheds light on the natural habitats around the world. It is also essential in understanding why species are in their present locations and in developing protecting the world's natural habitats. The current syllabus is designed to promote to make the students aware about the biotic and abiotic factors, its distribution and its correlation along with the impact of human activities on it. Students will get the knowledge of importance of the biotic balance and the conservation necessity of the different elements of the biosphere. Students will get the knowledge of different policies for its conservation.

Course Objectives: To enable the student…

1. To understand the definition, nature, and history of biogeography.
2. To understand the concept of biogeography.
3. To identify the animal and plant classification.
4. To understand the biogeographic process and biological interactions.
5. To evaluate the influencing factors on plant life and conservation of biodiversity

Course Outcome: After studying the course, the student will able to …

CO1: Appreciate the variety of processes, which can be responsible for species distributions at global, regional, landscape and island scales.

CO2: Understand the relative importance of different biogeographic processes.

CO3: Recognize the role of humans in modifying plant and animal distributions, with a specific understanding of the issues.

CO4: Appreciate how knowledge from the past can inform future predictions of biogeographic change, while realizing the limitations of this approach.

CO5: Understand critically human impacts on species distributions and modern conservation strategies.

Expected Skills impartation (Through theory and practical)

1. Understanding skill

2. Evaluative skill
3. Critical thinking skill
4. Analytical skill

Module No.	Title & Content	Credit	Hours	COs
I	**Nature, Content and Concepts of Biogeography** 1.1 Definitions, Nature, Scope & Significance of Biogeography. 1.2 History of Biogeography. 1.3 Concepts in Biogeography – (Linnaeus, Humboldt, Darwin, Wallace, Wegner, Croizat). 1.4 Communities and patterns in biogeography – Biomes, Hotspots, biodiversity, alpha beta diversity.	1	15	1&2
II	**Animal and Plant Classification** 2.1 Taxonomical Classification. 2.2 Ecological Classification. 2.3 Geographical Classification. 2.4 Raunkiaer's Classification.	1	15	3
III	**Biogeographic Process** 3.1 Evolution process and adaption. 3.2 Dispersion and vicariance process, and Speciation. 3.3 Colonization process Invasion and Extinction process. 3.4 Biological Interactions (predation, competition, mutualism, parasitism, mimicry).	1	15	4 &5
IV	**Plant Life and Theories** 4.1 Influencing factors on plant life – Climate and Physical. 4.2 Island Biogeography – Equilibrium theory, neutral theory. 4.3 Species Area Relationship. 4.4 Conservation of biogeography.	1	15	6
Practical work: Case Study / Field Survey / Field Visit / Project				

1. Field Visit: 1. Observation of local plant life.
   2. Biodiversity hotspot area.
   3. Field Visit to Forest /Agriculture field.
2. Home Assignment

Reference Books:

- Barry C. (1977): Biogeography – An ecological & evolutionary Approach, Oxford.
- Briggs John C.: Global Biogeography: Arnoldsville, Georgia, USA.
- Cole M.M. (1975): Recent developments in Biogeography, Longman, London.
- Danserau P. (1957): Biogeography- An Ecological perspective, Renold Press, New York.
- Darlington P. J. (1957): Zoogeography – Methew, New York.
- Furley P. A, & Newly W. N. (1983): Geography of the Biosphere: Butter Worth, London.
- Joy T. V. (1997): Biogeography – study of plants in the ecosphere.
- Martin C. (1975): Plant Geography. Methuen, London.
- Mathur H. S. (1986): Elements of Biogeography, Pointer Jaipur.
- Muller P. (1986): Biogeography; Harper & Row, New York.
- New big in M. I. (1986): Plant & Animal Geography: Methuen, London.
- Pears N. (1985): Basic Biogeography, Longman, London.
- Richard John Huggett: FUNDAMENTALS OF BIOGEOGRAPHY.
- Simmms T. G.: Biogeography, Natural & Cultural, Arnold & Heinemann, London.
- Watts, d. (1971): Principles of Biogeography, McMillan, London.

Journal:

- Bio One Journals
- Journal of Biogeography
- Global Ecology and Biogeography
- Frontiers of Biogeography
- Biogeographia

Additional Reading:

- Evolutionary ecology and biogeography
- Daily news related to this paper

Medium of Instruction: English

Library and Laboratory equipment:

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA

Chhatrapati Shivaji College, Satara

(A Constituent College)

Syllabus for

M.A./M.Sc. Part II: Semester-III

(w.e.f. June, 2024 onwards)

Settlement Geography-B

Course Code: MEGEO05303 **Credits: 04**

Preamble:

The aims of this course are to acquaint the students with the spatial and structural characteristics of human settlement under varied environment conditions. Settlement geography is the study of human land, water and resource use, population density patterns, and settlement growth. Settlement geography studies these villages, towns, etc. and the types of relationships they generate. A comprehensive study of settlement requires explanation of site & situation, function, types & patterns, characteristics, morphology, Study of urban hierarchy / ranking-spacing & morphology, theories and models of settlement helps to show the realistic scenario.

Course Objectives: To enable the students -

1. To study the Evolution, growth and types of human settlements
2. To study the geography of rural and urban settlement
3. To study the theories and models in settlement geography

Course Outcomes: After studying the course, the student will able to….

CO-1. Acquaint the students with the spatial and structural characteristics of human settlement undervaried environment conditions

CO-2. Study of human land, water and resource use, population density patterns, and settlementgrowth

CO-3 Understand the fundamental concepts in settlement geography

CO-4 Familiarize about Geography of Rural Settlement in India

CO-5 Understand the Functional classification of urban settlement

CO-6 Assess various urban problems and suggest remedies for them

CO-7 Understand the theories and models in the settlement geography

Expected Skills impartation (Through theory and practical`s)

1. Reading skill
2. Evaluating skill
3. Thinking skill
4. Analyzing skill

Module No.	Title & Content	Credit	Hours	COs

I	**Fundamentals of Settlement Geography** 1.1 Meaning, nature, scope and significance; 1.2 Evolution and growth of human settlements; 1.3 Types of settlements 1.4 Site and Situation: Concept, Type and affecting factors	1	15	1, 2, 3
II	**Geography of Rural Settlements** 2.1 Morphology and regional characteristics 2.2 Transformation of Indian villages, Rural planning and challenges. 2.3 Rural Housing and its problems in India 2.4 Rural Housing schemes in India	1	15	4
III	**Geography of Urban Settlements** 3.1 Processes of urbanization, suburbanization, urban fringe, urban sprawl 3.2 Functional classification of urban settlements; 3.3 Size and spacing of cities- rank-size rule, law of primate city, urban hierarchies 3.4 Urban problems and solutions, planning and challenges, Concept of smart city, Garden city movement, Urban agriculture.	1	15	5, 6,
IV	**Theories and Models in Settlement Geography** 4.1 Concentric zone theory 4.2 Multiple nuclei theory 4.3 Central place theory 4.4 Sector model and the exploitative model	1	15	7

Practical work: Case Study / Field Survey / Field Visits / Project

1. Find out rural settlement type/s in your surrounding area
2. Collect the information about the implementation of Rural Housing schemes in your village
3. Find out the trend of urbanization of your nearest city
4. Find out urban problems of your nearest city

Reference Books:

- Carter, H. (1975): The study of urban geography. Edward Arnold, London.
- David, P., Hopkinson M. (1983): The Geography of Settlements, Oliver & Boyd; 2nd Revisededition.
- Deniel, P. (2002): Geography of Settlements. Rawat Publications, Jaipur and New Delhi.
- Gosh, S. (1998): Introduction to Settlement Geography. Orient Longman.
- Haggett, Peter (1991): Geography-A Modern Synthesis, Harper & Row, New York.

- Hornby,WF., Jones M. (1991): An Introduction to Settlement Geography. Cambridge University Press. 7. Johnston, J.H. (1974): Urban Geography, Pergoman Press, Oxford.
- Johnston, R, J. (1984): City & Society. Unwin, London.
- King, L.J., Golledge R.G. (1978): Cities, Space & Behavior, Prentice Hall, Engle wood cliff, New Jersey. 10. Mandal, R.B. (2000): Urban Geography, Concept Publishing Co., New Delhi.
- Mayer, H.M., Cohen (1967): Readings in Urban Geography, Central Book Depot. Allahabad.
- Mosely, M.J. (2005): Rural Development: Principles and Practice. Sage Publication, London.
- Northamray, M. (1975): Urban Geography, John Willey & Sons, New York.
- Pacione, M. (2009): Urban Geography-A Global Perspective. 3rd edition. Routledge, London.
- Ramachandran, R. (1991): Urbanization and Urban Systems in India, Oxford Uni. Press. Delhi.
- Robinson, Brian T. (1973): Urban growth, Mathuen& Company, London.
- Rykwert, J. (2004): Settlements. University of Pennsylvania Press, University Park, USA.
- Sidhartha, K. and Mukherjee, S. (2000): Cities-Urbanizations & Urban Systems. Kisalaya Pub.Pvt. Ltd., New Delhi.
- Singh, RY. (1994): Geography of Settlements. Rawat Publications.
- Singh, R.L. (eds.) (1973): Rural Settlements in Monsoon Asia, National Geographical Societyof India, Varanasi.
- Singh, R. L., Singh, K.N. and Singh, Rana P.B., (eds.) (1975): Readings in Rural SettlementGeography, National Geographical Society of India, Varanasi.
- Singh, R. L. and Singh, Rana P. B. (eds.) (1978): Transformation of Rural Habitat in Indian Perspective, National Geographical Society of India, Varanasi, Pub. 19.
- Singh, R.L. and Singh, Rana P.B., (eds.) (1979): Place of Small Towns in India. NationalGeographical Society of India, Varanasi,
- Singh, R.L., Singh, K.N and Singh Rana P.B., (eds.) (1976): Geographic Dimensions of RuralSettlements. National Geographical Society of India, Varanasi.
- Wood, M. (2005): Rural Geography: Processes, Responses and Experiences of RuralRestructuring. Sage Publication, London.
- Yeates & Garner (1971): Readings in Urban Geography. The North American City. Harper &Row. New York.

Journals:

1. Journal of settlement and spatial planning
2. International Journal of Innovative research technology

Additional readings:

- Daily news related to this paper

Medium of instructions: English

- Library and Laboratory equipments:

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA
Chhatrapati Shivaji College, Satara
(A Constituent College)
Syllabus for
M.A./M.Sc. Part II: Semester-III
(w.e.f. June, 2024 onwards)
Research Report

Course Code: RPGEO05301 **Credits: 04**

Preamble:

A wide variety of research is being completed and published in geography education. Learning about research should be a rewarding experience that allows students to pursue their own interests, learn more about a chosen topic and, above all, examine a subject from different perspectives. The best reason for researching a topic in depth is that one finds it stimulating and important. Many prominent geographers have been attracted to the field precisely because of its wide remit, and some topics, that are now considered mainstream were, as recently as a generation ago, not considered to be part of the discipline. Therefore, we encourage students to let their imagination run free as they select objects of analysis and ways to study them.

Course Objectives: To enable the student-

1. To experience the process of selection of research topic and construct the research design.
2. To inculcate the skill of various research methods in view of research project.
3. To develop the research writing ability among students by considering the research ethics.

Course Outcomes: After studying the course, the student will be able to…

CO-1 Formulate clearly and briefly applied research problems
CO-2 Construct the research design
CO-3 Compile the data from primary and secondary sources of the data
CO-4 Process the data by applying various techniques
CO-5 Conduct applied research by systematically processing
CO-6 Write the research report in various formats

Expected Skills impartation (Through theory and practical`s)

1. Data collection skill
2. Data analysis skill
3. Research Writing skill
4. Interpersonal communication
5. Comprehension skills
6. Thinking ability

Title & Content	Credit	Hours	COs
Students required to select an exploratory topic of	4	60	1 to 6

geographical importance based on empirical evidences of literature. They are expected to carryout fieldwork & use primary and secondary data, analyze it & prepare a Project Report to submit at the time of examination.			

Reference Books:

- Archer J.E. & Dalton T.H. (1968): The fields work in Geography, E.t.
- BatsfordLtd., London. Burrough P.A. and McDonnell R.A. (2000): Principle of Geographical Information System, Oxford
- Burt, J.E. and Barber, G.M. (1996): Elementary statistics for Geographers, The Guilford press, New York.
- Clark, W.A.V. and Hosking, P.C(1986): Statistical Methods for Geographers, John Wiley & Sons, New York.
- Geoge Joseph (2003): Fundamental of Remote Sensing, Universities Press, Hyderabad.
- Gregory, S. (1963): Statistical Methods and Geographer Longman Group Ltd; London
- Haring, Lloyed (1975): Scientific Geographic Research WC.Brow Company USA.
- Hammerton, M. (1975) Statistics for Human Sciences, Longman Group Ltd, Barlow.
- Johnes, P.A. (2008): Field Work in Geography, Longman.
- Jones, Christopher (1997): Geographical Information System and computer Cartography, Addison Wesley Longman Limited, England
- Kanetkar T. P. &Kulkarni S.V. (1986): Surveying & leveling, VidyarthiGrihaPrakshan, Pune.
- Karlekar,Shrikant and Kale Mohan (2005): Statistical analysis of Geographical data, Dimond publication
- Keates, J.S. (1973): Cartographic design and production 2nd Edn; Longman group Limited, London.
- Keates, J.S. (1996): Understanding Maps, 2ndEdn; Longman group limited, London.
- King, (1975): Statistical Geography
- Kothari C.R. (2004): Research Methodology: Methods and Techniques, new age international (p) limited, publishers, 4835/24, Ansari Road, Daryaganj, New Delhi - 110002
- Maling.H. (1973): Co-ordinates systems and map projections, George Philip, London.
- Misra R.P. (1991): Research Methodology in Geography, concept pub. New Delhi.
- Norcliff, G.B. (1982) Inferential Statistics for Geographers Hutchinson, London.
- Norcliffe G. B. (1977): Inferential statistics for Geographers (Hutchinson, London)
- Prasad, H. (1992): Research Methods and Techniques in Geography,Rawat Publications,Satyam Apartments, Sector 3, Jawahar Nagar, Jaipur 302 004
- Richardus P., Adler Ron K (1972): Map projections, North Holland publ. Co. Amsterdam
- Robinson, A.H.et al.(1985): Elements of Cartography, Vol.VI, John Wiley and Sons, New York.
- Rogerson P. A. (2001): Statistics for Geography (SAGE pub., London, New Delhi.

Journal:

1. Deccan Geographer
2. Cartography and Geographic Information Science
3. Goa Geographer
4. Maharashtra Bhugolshastra Sanshodhan Patrika

Additional readings:

- Shaw G and Wheller D. (1985): Statistical techniques in geographical analysis. John Wiley and sons,
- Singh &Kanauja: Map work and Practical Geography.
- Sumner G J (1978): Mathematics for physical geographers. Edward Arnols
- Taylor, P.J. (1977): Quantitative Methods in Geography. Houghton Mifflim Company, Boston University Press.
- V. Natarajan P., Adler Ron K: Advanced Surveying, B. 1 Publ. Bombay
- Watson, G. and McGraw, D. (1980): Statistical Inquiry, John Wiley and sons, New York.
- Wilsons, A.G. &Bennet, R. J. (1985): Mathematical Methods In Human Geography And Planning, John Wiley & Sons, New York
- Yeates, M. (1974). An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

Medium of Instruction: English

Special instructions, if any: English

Library and laboratory equipment's:

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA
Chhatrapati Shivaji College, Satara
(A Constituent College)
Syllabus for
M.A./M.Sc. Part II: Semester-IV
(w.e.f. June, 2024 onwards)
Development of Modern Geographical Thought

Course Code: MMGEO05413 **Credits: 04**

Preamble

"Geographic thought" as commonly understood in the discipline of geography encompasses the development of geographic knowledge in particular places, times, and contexts. Accordingly, it has traditionally been—and continues to be-primarily approached from a historical perspective. The accumulation of geographical scholarship since the late nineteenth century has encouraged a fusion of historical and geographical skills and interests. In the process, the study of the history of geographical thought should continue to strengthen its central position within the subject as a whole. Yet at the same time, research into this modern era insists upon a more generous incorporation of significant contributions to environmental appraisal and landscape authorship developed by government and non-government actors, and a consideration of vernacular or non-scientific modes of inquiry.

Course Objectives: To enable the student-

1. To understand the development of geography in ancient period.
2. To know the philosophical background and dualism in geography.
3. To critically analysis the contribution of major geographers.

Course Outcomes: After studying the course, the student will be able to…

CO-1. Explain the philosophy in geography

CO-2. Compare the various dualisms in geography

CO-3. Distinguish between systematic and regional geography

CO-4. Rephrase geography as scientific discipline

CO-5. Identify various paradigms in geography,

CO-6. Illustrate the process of law, model and theory building

Expected Skills impartation (Through theory and practical`s)

1. Asking Geographic Questions
2. Organizing Geographic Information

3. Perspectives and viewpoints on different aspects of geography
4. Critical Writing skill
5. Reading skill
6. Interpersonal communication
7. Critical Thinking ability

Module No.	Title & Content	Credit	Hours	COs
I	**Introduction to Geographical Thought** 1.1 Geography as a social and natural Science, 1.2 Contribution of Greeks and Romans in Geography 1.3 Contribution of Arabs and Chinese in Geography 1.4 Contribution of Indians in Geography	1	15	1,2 & 3
II	**Contribution of Modern Geographers** 2.1 Alexander Von Humboldt & Carl Ritter 2.2 Friedrich Ratzel & Vidal de la Blache 2.3 Ellen Churchill Sample & Richard Hartshorne 2.4 Halford Mackinder & W. M. Davis	1	15	4,5 & 6
III	**Dichotomy in Geography** 3.1 Physical and Human Geography 3.2 Systematic and Regional Geography, 3.3 Determinism and Possibilism 3.4 Quantitative Revolution in Geography	1	15	7
IV	**Scientific Explanations and Approaches Explanation in Geography,** 4.1 Approaches in Geography- Positivism, humanism, Radicalism, Behaviorism and Post modernism. 4.2 Paradigms in Geography 4.3 Scientific explanations: inductive and deductive 4.4 Explanations in Geography	1	15	

Reference Books:

- Abler, Adms, J. & Gould, P. (1971): Spatial Organization. The Geographer's View of the World, Prentice Hall, New Jersey.
- Adhikari, Sudeepta (1972): Fundamentals of Geographic Thought, Chaitanya Publishing House, Allahabad.
- Ali. S.M.: The Geography of Puranas, Peoples Publishing House, Delhi, 1966.
- Amedeo, Douglas (1971): An Introduction to Scientific Reasoning in Geography, John Wiley, U.S.A.,1971.
- Braithwaite, E.B (1960): Scientific Explanation, Harper Toreh Books, New York.
- Bunge, W. (1962): Theoretical Geography, Land, GWK Gleeup (Land Studies In Geography, Series C1.

- Bunge, W. (1979): Fred K. Shaeffer and The Science of Geography, Annals, Association of American Geographers, 69:128-32.
- Bunting, T.E, Guelke, L. (1979): Behavioral and Perception Geography: A Critical Appraisal, Annals, Association of American Geographers, 69:448-62.
- Burton, I (1963): The Quantitative Revolution and Theoretical Geography, The Canadian Geographer 7:151-62
- Dear, M. J. &Flusty, S. (2002): The Space of Post Modernity: Readings in Human Geography, Blackwell.
- Dikshit, R. D. (2004): Geographical Thought: A Critical History of Ideas.
- Dixit, R.D. (1999): The Arts and Science of Geography, Integrated Readings; Prentice Hall of India Private Ltd, New Delhi.
- Dickinson, R.E. (1969): The Makers of Modern Geography, Hall Book Depo, Bhopal Prenrtice-Hall of India, New Delhi. (English and Hindi).
- Dixit, R.D. (1999): Development of Geographic, Thought Longmans India Limited.
- Free Man, T.W. (1965): Geography as Social Science, Harper International Edition Harper & Row, Publishers, New York.
- Gold, J.R. (1980): An Introduction to Behavioral Geography, Oxford University Press, Oxford.
- Harvey, D. (1969): Explanation in Geography, London, Edward Arnold. 18. Harvey, David (1969): Explanation in Geography, Edward Arnold, London.
- Harvey, David (1973): Social Justice and the City, Edward Arnold, London.
- Harvey, David (1989): The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change, Basil Blackwell, Oxford.
- Harvey, D (1989): The Condition of Postcolonial, Blackwell.
- Hartshorne, R. (1959): Perspective on the Nature of Geography. Rand Mcnally, Chicago.
- Hartshorne, R. (1939): The Nature of Geography, Lancaster, Association of American Geographers.
- Hartshorne R. (1954): Comment on Exceptionalism in Geography, Annals, Association of American Geographers, 44:103-90
- Holt Jensen, Arid: (1998) Geography: History and Concepts, Sage Publication, New Delhi.
- Johnston, R.J. (1983): Geography and Geographers, Aglo-American Human Geography Since 1945, Edward Arnold, London, 2nd Edition.
- Johnston, R.J., Gregory, D., Smith, D.M. (Ed) (1986): The Dictionary of Huma Geography, Blackwell.
- Johnston R. J. &Sidaway, J. D. (2004): Geography and Geographers, 6th Edition, Edward Arnold, London.
- Johnston, R.J. (1988): The Future of Geography, Methuen, London.
- Lefebvre, H. (1991): The Production of Space, Blackwell (Translated by D. Nicholson Smith).
- Ley, D Samuel, M.S. (ed.) (1978): Humanistic Geography: Prospects and Problems, Croom Helm.
- Majid, Hussain (1999): Geographic Thought, Rawat Publishing House, Jaipur.
- Minshull, R.: The Changing Nature of Geography, Hutchinson University Library,
- London, 1970. 35. Peet, R. (1977): Radical Geography - Alternative View Points on Contemporary Social Issue. Methuen & Co. Ltd. London. 36. Peet R. And Thirft, N. (Eds.): New Models in Geography, Vo.I&II Unwin Hyman.

Journal:

1. Deccan Geographer
2. Cartography and Geographic Information Science
3. Goa Geographer
4. Maharashtra Bhugolshastra Sanshodhan Patrika

Additional Readings:

1. Pickles, I. (1985): Phenomenology, Science and Geography: Spatiality and The Human Sciences, Cambridge, Cambridge University Press.
2. Peet, R. (1998): Modern Geographical Thought, Blackwell Publishers Inc. Massachusetts.
3. Shaefer, F.K. (1953): Exceptionalism in Geography: A Methodological Examination, Annals Association of American Geographers,
4. 226-49. 43. Singh, R.L. (2008): Fundamentals of Human Geography, Sharada Pustak Bhawan, Allahabad.
5. Soja, E.W. (1977): Postmodern Geographies, Rawat Publications, Jaipur.
6. Unwin, T. (1992): The Place of Geography, Longman, UK.

Medium of Instruction: English

Special instructions, if any: English

Library and laboratory equipment's:

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA
Chhatrapati Shivaji College, Satara
(A Constituent College)
Faculty of Science & Technology
Syllabus for
M.A. / M.Sc. Part II: Semester-IV
(w.e.f. June, 2024 onwards)
Geohydrology and Oceanography

Course Code: MMGEO05414 **Credits: 04**

Preamble:

Geohydrology and Oceanography both are the important branches of Physical Geography. The importance of hydrology is increasing because of the global growth of water needs and the rise of water scarcity, which together cause greater risk and unreliability in water resources management. The basic task of hydrology, which is fundamental for water resources management, is the accurate definition and control of the water balance for different space and time increments. Oceanography is a branch of earth science, which deals with the study of world oceans. Oceanography is a broader term in which many sciences focused on the common goal of understanding the oceans. Oceanography has moved into the spotlight of urgent social concern, because of the oceans' impact on issues such as global climate change, biodiversity, and even national security.

Course Objectives: To enable the student-

1. To introduce the concept of basin hydrology and oceanography.
2. To categorize distribution of ground water.
3. To Distinguish between geohydrology and oceanography.
4. To Evaluate the various ground water regimes and watershed management.

Course Outcome: After studying the course, the student will able to …

CO1: Explain the basic concept of Groundwater and basin hydrology.

CO2: Elaborate the distribution of ground water and Watershed Management.

CO3: Formulate clearly and briefly elements watershed management.

CO4: Describe Topography of the ocean floor and Bottom relief of ocean.

CO5: Apply the knowledge for global environment, marine pollution.

Expected Skills impartation (Through theory and practical)

1. Map reading skills
2. Problem solving
3. Analytical skill
4. Comprehension skill
5. Computing ability

Module No.	Title & Content	Credit	Hours	COs
I	**Groundwater & Basin Hydrology** 1.1 Surface & subsurface water resources 1.2 Groundwater: occurrence, movement and management; types of aquifers 1.3 Groundwater regimes in India 1.4 Basin hydrology: Hydrological cycle – precipitation, evaporation infiltration and run off	1	15	1
II	**Applied Geohydrology** 2.1 Water Pollution 2.2 Problems related to water use: salinity, alkalinity and water logging 2.3 Conservation and planning of water resources 2.4 Watershed Management	1	15	2 & 3
III	**Oceanography** 3.1 Definition and Importance of Oceanography. 3.2 Topography of the ocean floor: continental shelf, slope, rise, submarine channels, hills, ridges, trenches and abyssal plains 3.3 Bottom relief of Pacific, Atlantic and Indian Ocean 3.4 Origin and evolution of island arcs	1	15	4
IV	**Physical, Chemical and Biological Oceanography** 4.1 Ocean circulation: currents, waves and tides; Currents of Pacific, Atlantic, & Indian Ocean 4.2 Properties of oceanic water: chemical composition, salinity, temperature, and density 4.3 Origin, growth and theories of coral reefs 4.4 Marine resources, Ocean and global environment, marine pollution	1	15	CO5

Practical work: Case Study / Field Survey / Field Visit / Project

1. Field Visit: Visit to Ground Water Survey Department (GSD)

2. Collect the information about water pollution/watershed management

project/water logging.

3. Prepare map of coral reef/oceanic plates

4. Home Assignment

Reference Books:

- Cech, TV (2009): Principles of Water Resources: History, Development, Management, and Policy (3rd Ed.), Wiley, Hoboken, New Jersey, 576pp.
- Chow, V.T., Maidment, D.R., and Mays, L.W. (1988): Applied Hydrology, McGraw-Hill, New York, 540pp.
- Christopherson, R.W (2012): Geosystems: An Introduction to Physical Geography (8^{th} Ed.), Prentice Hall, New Jersey, 693pp.
- Davis, R., and Fitzgerald, D. (2003): Beaches and Coasts, Wiley-Blackwell, Hoboken, New Jersey, 432pp.
- Day, T. (2008): Oceans (Rev. Ed), Facts on File, New York, 337pp.
- Garrison, T (2009): Essentials of Oceanography (5th Ed.), Brooks/Cole, Belmont, California, 463pp.
- Fitts, C.R. (2002): Groundwater Science, Academic Press, 450pp.
- Han, D. (2010): Concise Hydrology, Dawai Han and Ventus Publishing, 145pp.
- Pinder, G.F., and Celia, M.A. (2006): Subsurface Hydrology, Wiley, Hoboken, New Jersey, 485pp.
- Pinet, P.R. (2009): Invitation to Oceanography (5^{th} Ed.), Jones and Bartlett Publishers, Sudbury, Massachusetts, 609pp.
- Raghunath, H.M. (2006): Hydrology: Principles, analysis and Design (2nd Ed.), New age International, New Delhi, 477pp.
- Schwartz, F.W., and Zhang, H. (2002): Fundamentals of Ground Water, Wiley, Hoboken, New Jersey, 592pp.
- Skinner, B.J., and Murck, B. W. (2011): The Blue Planet: An Introduction to Earth System Science (3rd Ed.), Wiley, Hoboken, New Jersey, pp. 221-319.
- Sverdrup, K., and Armbrus, V. (2008): Introduction to the World's Oceans (10th Ed.), McGraw-Hill, New York, 528pp.
- Trujillo, A.P., and Thurman, H.V. (2010): Essentials to Oceanography (10th Ed.), Prentice Hall, New Jersey, 576pp.
- Viessman, W., and Lewis, G.L. (2002): Introduction to Hydrology (5th Ed.), Prentice Hall, New Jersey, 612pp

Journal:

1. Water Resources Research
2. Groundwater,
3. Hydrogeology Journal
4. Oceanography
5. Limnology and Oceanography,
6. Deep Sea Research Part I: Oceanographic Research Papers and Deep-Sea Research

Additional Reading:

1. "Applied Hydrogeology" by C.W. Fetter

2. "Principles of Hydrogeology" by R.C. Ward and M. S. Robinson
3. "Groundwater" by R. Allan Freeze and John A. Cherry
4. "Introduction to Physical Oceanography" by Robert H. Stewart
5. "Essentials of Oceanography" by Alan P. Trujillo and Harold V. Thurman

Medium of Instruction: English

Library and Laboratory equipment's

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA
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Syllabus for
M.A./M.Sc. Part II: Semester-IV
(w.e.f. June, 2024 onwards)
Introduction to GIS Software and GPS Survey

Course Code: MMGEO05415 **Credits: 04**

Preamble

Geographical Information System (GIS) and Global Navigation Satellite System (GNSS) is a powerful, efficient and advance tool for the manipulation and representation of geographical data. It widely used in the different fields for four decades. Geographical information system has ability to capture, store, arrange, manipulate, classify, analyze, manage, and present huge geographic data in short period with the help of software and hardware. Different licensed and open-source software's are available globally. Quantum GIS (Q-GIS) is open-source GIS software widely used in the different government and private sectors. Introduction and basic function of this software is useful for the students for getting better knowledge of GIS with free of cost. Today different countries launched their own Positioning System for the identification of location on the earth surface. The basic knowledge and technical information of the GPS will be useful for the student for the various application including surveying, mapping and navigation.

Course Objective: at the end of this course, students will be able to…

1. To introduce the student several key outcomes that demonstrate their proficiency and ability to apply QGIS in various contexts
2. To familiarization the students with QGIS Interface.
3. To acquire skills in data handling, management, data analysis, processing, visualization and mapping using QGIS

Course Outcomes:

CO1- Introduction of open-source Q-GIS software and proficiency in QGIS Interface

CO2- Real-World Application of QGIS

CO3- Explain the Functioning and application of GPS

Expected Skills impartation (Through practical`s)

1. Handling of Q-GIS software and proficiency in QGIS Interface
2. Analytical Skills and Practical Application
3. Digitization and spatial analysis techniques
4. Practical knowledge of GPS

Module No	Title & Content	Credit	Hours	COs
I	**Introduction to QGIS** 1.1 QGIS Installation and Overview of QGIS interface 1.2 Geo-referencing and Image Registration 1.3 Projection and Reprojection	1	30	1
II	**Module 2: Basics of QGIS** 2.1 Digitization 2.2. Working with tables 2.3 QGIS Plugins	1	30	1,2
III	**Data Exploration** 3.1 Preparation of Thematic Map and Map Layout 3.2 Spatial Analysis: Network, Terrain, Nearest Neighbor, Interpolation 3.3 Data Query: Spatial and Attribute	1	30	1,2
IV	**GPS Survey** 4.1 Handheld training of GPS receiver 4.2 Navigational application of GPS using cellphone 4.3 Field Work/Study Tour: Tour planning/ GPS Survey, Data Import, Processing and Mapping	1	30	3

Practical work: Case Study / Field Survey / Field Visits / Project

1. Discuss open source and licensed GIS software's
2. Use navigation system of mobile to rout finding
3. Calculate the specified area using GPS
4. Field work: Ground truth for toposheet /GPS survey/Tour planning

Reference Books:

- Ahmed El-Rabbany, Introduction to GPS: The Global Positioning System, Artech House.
- Bhatta, B. (2018) Remote Sensing and GIS. Oxford University Press, India.
- Chang, Kang-tsung. (2002). Introduction to Geographic Information Systems. New Delhi: Tata McGraw-Hill Publishing Company Limited.

- 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.
- Reddy, M.A. (2006). Textbook of Remote Sensing and Geographical Information Systems. Hyderabad: B.S. Publications.

Journals:

- ASPRS Photogrammetric Engineering and Remote Sensing
- Geospatial world
- IEEE Letters on Geosciences and Remote Sensing
- IEEE Transactions on Geosciences and Remote Sensing
- IJPRS Journal of Photogrammetry and Remote Sensing
- International Journal of Remote Sensing
- Journal of the Indian Society of Remote Sensing
- Remote Sensing of Environment

Websites:

- Bhuvan: http://www.bhuvan.nrsc.gov.in
- https://docs.qgis.org/2.18/pdf/en/QGIS-2.18-UserGuide-en.pdf
- https://download.osgeo.org/qgis/doc/manual/qgis-0.7.4_user_guide_en.pdf
- https://qgis.org/en/site/
- https://www.geospatialworld.net
- https://www.gps.gov
- https://www.gpsworld.com
- Indian Space Research Organisation (ISRO), India: http://www.isro.org
- International Society for Photogrammetry and Remote Sensing (ISPRS): http://www.isprs.org
- National Aeronautics and Space Administration (NASA), USA: http://www.nasa.gov
- National Oceanic and Atmospheric Administration (NOAA), USA: http://www.noaa.gov
- National Remote Sensing Centre (NRSC), India: http://www.nrsc.gov.in
- United States Geological Survey (USGS), USA: http://www.usgs.gov

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA
Chhatrapati Shivaji College, Satara
(A Constituent College)
Syllabus for
M.A./M.Sc. Part II: Semester-IV
(w.e.f. June, 2024 onwards)
Agricultural Geography-A

Course Code: MEGEO05404 **Credits: 04**

PREAMBLE:

Agricultural Geography is a major and developed branch of Economic Geography. Being a dominant economic activity, it has a great importance in the developing world. The present syllabus of this paper includes Definition, Nature, Scope, approaches and significance of Agricultural Geography. It includes determinants of Agriculture and Agricultural systemsof the world, various techniques of delimitation. This paper consist land use theories, agricultural development in India.

Course Objectives: To enable the students-

1. To understand the origin and dispersion of Agriculture.
2. To examine the role of agricultural determinants towards the changing cropping pattern.
3. To study the Agricultural systems of the world
4. To study the mmethods of aagricultural regionalization
5. To study the aagricultural development in India

Course Outcomes: After studying the course, the students will be able to…

CO-1 Examining the introduction to agriculture, nature, scope, significance and development ofagriculture geography, approaches to study

CO-2 Understand the determinants of agricultural activities, physical determinants, and socio-economic determinants

CO-3 Understand the agricultural system of the world, types of agricultural, study of the following types of agricultural in respect of area, salient features and their problems

CO-4 Know the techniques of delimitation of agriculture regions

CO-5. Identify agricultural problems and prospects in India

Expected Skills impartation (Through theory and practical`s)

1. Acquiring agriculture sector information

2. Evaluating skills
3. Adopting suitable techniques for agricultural regionalization
4. Adopting agricultural development planning

Module No.	Title & Content	Credits	Hours	COs
I	**Introduction to agricultural Geography** 1.1Meaning and Definition of Agricultural Geography 1.2 Nature and scope of Agricultural geography; 1.3 Origin and dispersion of agriculture; 1.4 Approaches to the agricultural geography.	1	15	1
II	**Agricultural Systems** 1.1 Determinants of agricultural patterns-physical, social, economic and technological 1.2 Agricultural systems of the world - location, distribution, types & characteristics of agriculture	1	15	2, 3
III	**Methods of Agricultural Regionalization** 3.1 Concept & techniques of delimitation of agricultural regions- Crop combination (Weavers minimum deviation method), Crop diversification; (Bhatia's Method) 3.2 Measurement and determinants of agricultural Productivity (Kendall's Method), 3.3 Von Thunen's Agricultural land use theory 3.4 Spatial diffusion Process - Haggerstand	1	15	4
IV	**Agricultural development in India** 4.1 Agricultural Revolution in India (Green, White) Nature, Socio-economic constraints in the adoption, performance, Problems, solutions & prospects. 4.2 Land use survey, Dry land Agriculture, Food Security, Organic farming, Agro Tourism 4.3 Agricultural Policies in India, 4.4 Geographical indications (G.I.), patent bill and seeds act 2004, TRIPS: Haldi and Neem	1	15	5

Practical work: Case Study / Field Survey / Field Visits / Project

1. List out agricultural problems in your area
2. Globalization and agriculture
3. List of modern agricultural equipment / tools
4. Calculate Crop combination / Crop diversification

Reference Books:

- Alka Gautam (2012): Agricultural Geography, Sharda Pustak Bhawan, Allahabad.
- Bhatia B.M. (1977): Poverty Agriculture & Economic Growth, Vikas New Delhi.
- Bhatt, M.S (ed.) 2004: Poverty and Food Security in India Problems and Policies. Akkar Books, New Delhi.
- Brown, L.R. (1990): The Changing World Food Prospects - The Nineties and Beyond. World Watch Institute, Washington D.C.,
- Chorley, R. & Haggett P (1971): Socio-Economic Models in Geography, Methuen, London.
- Dyson, T. (1996): Population and Food - Global Trends and Future Prospects. Routledge, London,
- Gregory, H.F (1970): Geography of Agriculture: Themes in Research. Prentice–Hall, Englewood Cliff. London.
- Grigg, D.B. (1973): The Agricultural systems of The World, Cambridge University Press.
- Hagerstrand, T (1968): Innovation Diffusion as a spatial process, University of Chicago Press.
- Hussain, M. (1999): Systematic Agricultural Geography, Rawat publications, Jaipur. (India)
- Ilbury, B.W. (1983): Agricultural Geography. Oxford University Press, London.
- Morgan W.B. & Muton R. C. (1971): Agricultural Geography, Mathuen, London. -
- Shafi M. (1983): Agricultural Productivity and Regional Imbalances a Study of Uttar Pradesh, Concept, New Delhi.
- Singh Jasbir & Dhillon S.S (2004): Agricultural Geography, Tata Mc-Graw Hill Education, New Delhi.
- United Nations (2009): Sustainable Agriculture and Food Security in Asia and the Pacific. United Nations Publications.

Journal:

1. Journal of Sustainable Agriculture
2. The Journal of Agricultural Science

Additional reading

1. Daily news related to this paper
2. Census of India

Medium of Instructions, if any: English

Library and laboratory equipment's:

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA
Chhatrapati Shivaji College, Satara
(A Constituent College)
Syllabus for
M.A./M.Sc. Part II: Semester-IV
(w.e.f. June, 2024 onwards)
Regional Planning & Development - B

Course Code: MEGEO05404 **Credits: 04**

Preamble:

Regional planning and development are crucial for fostering balanced, sustainable, and inclusive growth. It ensures that all areas within a region benefit from development efforts, leading to a more equitable, resilient, and prosperous society. Study of regional planning and development is become a mandatory part in structure of the education programmes. The current syllabus is designed to promote to make the students aware about the regional planning and its development. Students will get the knowledge of importance of the regional planning and development. Regional planning is an important part of city planning. It focuses on how the various aspects of a city can work together to make it function in the best way possible. Students will get the knowledge of different policies for the regional development and planning.

Course Objectives: Enable the student…

1. To understand the concept of region, planning, planning region.
2. To know the concept of growth and development.
3. To identify the indicators of regional development and its measures.
4. To understand the theories and models for regional development.
5. To evaluate the regional planning in India.

Course Outcome: After studying the course the student will able to …

CO1: Understanding Process of Regional Planning.

CO2: Describe local, regional and central relationship and coordination for creating a regional plan.

CO3: Identify effective tools to implement regional infrastructure, transportation & land use plans.

CO4: Understanding utilities of theoretical framework in regional planning.

Expected Skills impartation (Through theory and practical)

1. Understanding skill
2. Evaluative skill

3. Interpretation skill
4. Critical thinking skill
5. Analytical skill

Module No.	Title & Content	Credit	Hours	COs
I	**Basic Concept of Region Planning** 1.1 Concept and types of region, Concept and types of planning. 1.2 Concept of Planning Region, Delineation of Planning Region. 1.3 Concept of growth and development, Concept of Regional Development. 1.4 Indicators of Regional Development, Measures of Regional Development.	1	15	1&2
II	**Theories and Models for Regional Development** 2.1 Myrdal's Cumulative Causation Theory, Friedman's Core-Periphery Model. 2.2 Central Place Theory. 2.3 Growth Pole Theory, R. P. Mishra's Growth Foci approach. 2.4 Rostow's Economic Growth Stage Model.	1	15	3
III	**Planning in India** 3.1 Institutional Planning Framework – National, State, District level development plans, Five Year Plans- policies, plans and outcome. 3.2 Special Economic Zones. 3.3 Damodar Valley Corporation. 3.4 Krishna Valley Development Corporation.	1	15	4&5
IV	**Regional Planning: India** 4.1 Regional Disparities – Physical and Socio-economical. 4.2 Rural Planning and Urban Planning – NCR Delhi. 4.3 Command Area Development Programme, Drought Prone Area Development Programme. 4.4 Tribal Area Development Programme, Hilly Area Development Programme.	1	15	6

Practical work: Case Study / Field Survey / Field Visit / Project

1. Field Visit: 1. Prepare a List of Indicators for a Tahsil level Development.
   2. Assess The Backwash Effect and Spread Effect of any Urban Centre.
   3. Make plans of District Rural Development System of your district.

2. Home Assignment

Reference Books:

- Adrill, J. (1974): New Citizens Guide to Town and Country Planning, Charies knight.
- Alden, J. and Morgan, (1974): Regional Planning: A Comprehensive View, Leonard Hill Books, Beds.
- Berry, BJ. L. and Horton F. F. (1970): Geographic Perspectives on Urban.
- Bhat L. S. (1972): Regional Planning in India, Statistical Publishing Society.
- Blij H. J. De, (1971): Geography: Regions and Concepts, John Wiley and Sons.
- Chand, M. & Puri, V. (1983): Regional Planning in India, Allied Publishers, Ltd., New Delhi.
- Chandra, R. C. (2000): Regional Planning and Development, Kalyani Publishers, Ludhiana. Company Ltd, London.
- Cook, P. (1983): Theories of Planning and Spatial Development, Hutchinson & Company Ltd, London.
- Daysch, C. H. J. and Others: Studies in Regional Planning.
- Diamond, D. (ed) (1982): Regional Disparities and Regional Policies, Pergamon Press, Oxford.
- Dickinson R. E. (1964): City and Region: A Geographical Interpretation. Routledge and Keagan Paul, London.
- Friedman, J. & Alonso W. (1964): Regional Development and Planning. MIT Press, Cambridge.
- Friedman, J. & Alonso W. (1975): Regional Policy – Readings in Theory and Applications, MIT Press, Massachusetts.
- Galasson, John (1974): An Introduction to Regional Planning Hutchinson. Educational London.
- Gilksin, A.: Regional Planning and Development.
- Gore C. G. (1984): Regions in Question: Space, Development Theory and Regional Policy, Methuen, London.
- Gore C. G., Kohler G., Reich U. P. and Ziesemer T. (1996): Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention, Metropolis – Verlag, Marburg.
- Hall, P. (1992): Urban and Regional Planning, Routledge, London.
- Haynes J. (2008): Development Studies, Polity Short Introduction Series.
- Hilborot, J. G. M. (1971): Regional Planning. Rotterdam University Press, Rotterdam.
- Johnson E. A. J. (1970): The Organization of Space in Developing Countries, MIT Press, Massachusetts.
- Kulshetra, S. K. (1912): Urban and Regional Planning in India: A hand book for Professional Practioners, Sage Publication, New Delhi.
- Kundu, A. (1992): Urban Development Urban Research in India, Khanna Publ. New Delhi.
- Mahesh Chand: Regional Planning.
- Mishra R. P. (Ed.): Regional Planning: Regional Development and Planning.
- Misra R. P., Sundaram K. V., PrakashRao VLS (1974): Regional Development Planning in India, Vikas Publication, New Delhi.
- Mishra R. P. (1992): Regional Planning: Concepts, techniques, policies and case.
- Misra, R. P. (1992): Regional Planning. Concept Publishing Company. New Delhi.
- Reddi, K. V. (1988): Rural Development in India, Himalaya Pub, Mumbai.
- Sharma, R.: Economics of growth and planning.

- Singh, R. L. (2008): Fundamentals of Human Geography, Sharada Pustak Bhawan, Allahabad, Studies, Concept, New Delhi.
- Sundaram, R. D.: Indian Economy.
- Sundran, K. V. (1977): Urban and Regional Planning in India, Vikas Publishing, New Delhi.
- Swawy, M. C. K., Bhaskara, R. Hegde, V. M. (eds.) (2008): Urban Planning and Development at Cross Roads, BC Books for Change, Bangalore.
- Whynnes, Charles & Hammand (1979): Elements of Human Geography, George Aflen & Unwin, London.

Journal:

- Journal of Regional Development and Planning
- International Journal of Rural and Regional Planning Development (IJRRPD)
- International Journal of Urban and Regional Research (ijurr)
- Indian Journal of Regional Science
- International Journal of Rural and Regional Development
- SAGE Journals

Additional Reading:

- Metropolis, Planning, Dwell Magazines
- Daily news related to this paper

Medium of Instruction: English

Library and Laboratory equipment's:

KARMAVEER BHAURAO PATIL UNIVERSITY, SATARA
Chhatrapati Shivaji College, Satara
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Syllabus for
M.A. / M.Sc. Part II: Semester-IV
(w.e.f. June, 2024 onwards)
Research Project - II

Course Code: RPGEO05402 **Credits: 06**

Preamble:

A wide variety of research is being completed and published in geography education. Learning about research should be a rewarding experience that allows students to pursue their own interests, learn more about a chosen topic and, above all, examine a subject from different perspectives. The best reason for researching a topic in depth is that one finds it stimulating and important. Many prominent geographers have been attracted to the field precisely because of its wide remit, and some topics, that are now considered mainstream were, as recently as a generation ago, not considered to be part of the discipline. Therefore, we encourage students to let their imagination run free as they select objects of analysis and ways to study them.

Course Objectives: To enable the student…

1. To experience the process of selection of research topic and construct the research design.
2. To inculcate the skill of various research methods in view of research project.
3. To develop the research writing ability among students by considering the research ethics.

Course Outcomes: After studying the course, the student will be able to…

CO-1 Formulate clearly and briefly applied research problems

CO-2 Construct the research design

CO-3 Compile the data from primary and secondary sources of the data

CO-4 Process the data by applying various techniques

CO-5 Conduct applied research by systematically processing

CO-6 Write the research report in various formats

Expected Skills impartation (Through theory and practical`s)

1. Data collection skill
2. Data analysis skill
3. Research Writing skill
4. Interpersonal communication
5. Comprehension skills
6. Thinking ability

Title & Content	Credit	Hours	COs

Students required to select an exploratory topic of geographical importance based on empirical evidences of literature. They are expected to carryout fieldwork & use primary and secondary data, analyze it & prepare a Project Report to submit at the time of examination.	6	6	1 to 6

Reference Books:

- Archer J.E. & Dalton T.H. (1968): The fields work in Geography, E.t.
- BatsfordLtd.,London. Burrough P.A. and McDonnell R.A. (2000): Principle of Geographical Information System, Oxford
- Burt, J.E. and Barber, G.M.(1996): Elementary statistics for Geographers, The Guilford press, New York.
- Clark, W.A.V. and Hosking, P.C(1986): Statistical Methods for Geographers, John Wiley & Sons, New York.
- Geoge Joseph (2003): Fundamental of Remote Sensing, Universities Press, Hyderabad.
- Gregory, S.(1963) : Statistical Methods and Geographer Longman Group Ltd; London
- Haring, Lloyed (1975): Scientific Geographic Research WC.Brow Company USA.
- Hammerton, M.(1975) Statistics for Human Sciences, Longman Group Ltd, Barlow.
- Johnes, P.A. (2008): Field Work in Geography, Longman.
- Jones, Christopher (1997): Geographical Information System and computer Cartography, Addison Wesley Longman Limited, England
- Kanetkar T. P. &Kulkarni S.V. (1986):. Surveying & leveling, VidyarthiGrihaPrakshan, Pune.
- Karlekar,Shrikant and Kale Mohan (2005): Statistical analysis of Geographical data, Dimond publication
- Keates, J.S.(1973) : Cartographic design and production 2ndEdn;. Longman group Limited, London.
- Keates, J.S.(1996) : Understanding Maps, 2ndEdn; Longman group limited, London.
- King, (1975): Statistical Geography
- Kothari C.R. (2004): Research Methodology: Methods and Techniques, new age international (p) limited, publishers, 4835/24, Ansari Road, Daryaganj, New Delhi - 110002
- Maling .H. (1973) : Co-ordinates systems and map projections, George Philip, London.
- Misra R.P. (1991): Research Methodology in Geography, concept pub. New Delhi.
- Norcliff, G.B.(1982) Inferential Statistics for Geographers Hutchinson, London.
- Norcliffe G. B. (1977): Inferential statistics for Geographers (Hutchinson, London)
- Prasad, H.(1992): Research Methods and Techniques in Geography,Rawat Publications,Satyam Apartments, Sector 3, Jawahar Nagar, Jaipur 302 004
- Richardus P., Adler Ron K (1972) : Map projections, North Holland publ. Co. Amsterdam
- Robinson, A.H.et al.(1985): Elements of Cartography, Vol.VI, John Wiley and Sons, New York.
- Rogerson P. A. (2001): Statistics for Geography (SAGE pub., London, New Delhi.

Journal:

1. Deccan Geographer
2. Cartography and Geographic Information Science
3. Goa Geographer
4. Maharashtra Bhugolshastra Sanshodhan Patrika

Additional readings:

- Shaw G and Wheller D. (1985): Statistical techniques in geographical analysis. John Wiley and sons
- Singh &Kanauja : Map work and Practical Geography.
- Sumner G J (1978): Mathematics for physical geographers. Edward Arnols
- Taylor, P.J.(1977): Quantitative Methods in Geography. HoughtonMifflim Company, Boston University Press.
- V. Natarajan P., Adler Ron K:. Advanced Surveying, B. 1 Publ. Bombay
- Watson, G. and McGraw, D.(1980): Statistical Inquiry, John Wiley and sons, New York.
- Wilsons, A.G. &Bennet, R.J.(1985): Mathematical Methods In Human Geography And Planning, John Wiley & Sons, New York
- Yeates, M. (1974). An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

Medium of Instruction: English

Special instructions, if any: English

Library and laboratory equipment's:

Karmaveer Bhaurao Patil University, Satara

Rayat Shikshan Sanstha's

Chhatrapati Shivaji College, Satara

(A Constituent College)

Name of the Programme: Geography

Evaluation Pattern for M. A. II (w. e. f. -June 2023)

Exam Pattern

1. **Examination Pattern: 60:40**

   (60 Weightage for End Semester Examination & 40 Weightage for Continuous Comprehensive Evaluation)

2. **Nature of Question Paper:**

End Semester Examination Question Paper Pattern for 60 Marks

Instruction: 1) All Questions are Compulsory.

2) All Questions carry equal marks.

3) Figures to the right indicate full marks.

Day and Date: Total Marks: 60

Time: Two Hours

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Q. 1. Choose the correct alternatives from the following	15
Q.2. Write short notes (*Three out of Four*)	15
Q.3. Write short answer (*Three out of Four*)	15
Q.4. Answer the following question in broad. (One out of Two)	15

End Semester Examination Question Paper Pattern for 30 Marks

Instruction: 1) All Questions are Compulsory.
2) All Questions carry equal marks.
3) Figures to the right indicate full marks.

Day and Date: Total Marks: 30

Time: One Hours

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Q. 1. Choose the correct alternatives from the following 08

Q.2. Write short notes (*Two out of Three)* 10

Q.3. Answer the following question in broad. (*One out of Two*) 12

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3. CCE (Continuous Comprehensive Evaluation):

3.1 Activities 40 Marks: For major paper of 4 credit

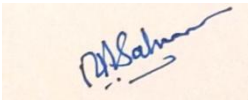
1. Project - 20 Marks
2. Online Class Test - 10 Marks
3. Oral -10 Marks

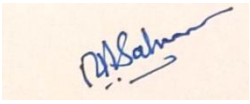
3.2 Activities 40 Marks: For OE & Other 4 Credit

1. Home Assignment - 10 Marks
2. Online Class Test - 10 Marks
1. Subject Specific Activity-20 Marks

3.3 Activities 20 Marks:

1. Subject Specific Activity: For all 02 credit papers- 20 Marks





Head
Department of Geography

Chairman
BoS in Geography