

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**  
**M.A. / M.Sc. APPLIED GEOGRAPHY**

**New Syllabus**  
**SEMESTER III & IV**  
**W. E. F. JUNE 2014-15**

**JOB OPPORTUNITY**

Geography has wide range of applications in fields like transportation, environmental sciences, airline route and shipping route planning, civil services, cartography (map making), satellite technology, population council, meteorology departments, education, disaster management are some of the careers. The job role as well as nature of work varies depending upon the job profile. Some of the popular opportunities within the field of geography in India include economical geography, cultural geography, political geography, historical geography, tourism geography, regional geography, and climatology and so on. One can specialise in related fields and become a geographer.

- **Govt Department:** A geographer can avail job opportunities in government departments (like planning and developmental commissions, forestry, environmental, and disaster management departments etc), travel agencies, manufacturing firms, text book and map publishers, media agencies, etc.
- **Cartographer:** Many people choose to work as a cartographer who is a person with extensive knowledge about maps and is involved in making maps, charts, globes, and models of Earth and other planets.
- **Surveyor:** Many others with a degree in geography also opt to work as a surveyor. A surveyor is the person who is involved in measuring the surface of land, distance between two places through mathematical calculations. Their job involves lot of on the field work and is majorly recruited by state and central survey departments, construction companies and so on. At SY and TY level Plane Table Survey, GPS Surveys are included in the syllabus. Many posts of surveyors are vacant in privet sector and Govt department of survey.
- **GPS Surveyors:** In recent days even the fields of GIS as well as Remote Sensing are providing job opportunities to people with the educational background in geography and related specialisations. And not to forget the management of the lifelines of most modes of transport that occurs via travel and tourism wherein people with a background in geography are often recruited (along with the required certifications) as tour operators, itinerary planners, tour guides and so on. Also those with PhD or relevant master's can also opt to teach the subject at school, college or masters level or may be involved in developing educational content for the relevant subject. Indeed, it is correctly said that geography is everywhere and opens our eyes to the world we live in, and so for those curious souls who love to know more and explore about the earth, the road towards geography may lead you to your final destination! Get going...
- **GIS and Remote Sensing Fields:** Geography as a career provides multiple job options. With the increased use of satellite technology and Geographical Information System, geography is becoming a more promising career option than it was ever before. The GIS is a

computer based information system which is used to digitally represent and analyse the geographic features present on the earth surface.

- Geographers provide their services in diverse fields. There are comparatively few geographers so they are in high demand at national and international level. The remuneration depends on the potential, experience, seniority and type of organisation. Generally private companies pay awesome wage along with other benefits, when compared with the government and public organisation. In the field of geography, a qualified person can expect a starting salary somewhere around Rs. 15,000 - 25,000 per month. The senior persons in private sector may draw more than Rs.1,20, 000 per month. Consultants also get attractive consultancy fees.
- **Drafter:** He/she associate closely with engineers and architectures. It involves planning, housing and development projects in terms of their location and utilization.
- **Government employer:** Central government agencies employ geographers for mapping, intelligence work and remote sensing interpretation. State and local governments employ geographers on planning and development commissions.
- **Urban and regional planner:** Concerned with planning, housing and Development projects with respect to their location and utilization of available land-space.
- **GIS specialist:** City governments, county agencies and other government agencies and private groups are often in need of experienced GIS professionals.
- **Climatologist:** Agencies viz. National Weather Service, news media, the Weather Channel and other government entities occasionally need climatologist. A geographer with experience and vast coursework in meteorology and climatology serves as the best climatologist.
- **Transportation manager:** The regional transit authorities or shipping, logistics and transportation companies requires in transportation geography.
- **Environmental Manager:** The environmental assessment, clean-up and management companies require a geographer for environmental impact reports. It's often a wide-open field with tremendous growth opportunities.
- **Science (Geography) writer:** One can serve as a science writer or a travel writer for a magazine or newspaper.
- **Researcher:** Many Government and non-government institutes along with research centres offers several career options for qualified geographers with numerous specializations.
- **Urban planner.**
- **Teacher/Professor:** The college teachers, school teachers and university teacher. Depending upon the experience and degrees obtained.
- **Demographer:** In government and research organizations.
- **Government officer:** Geographical Survey of India/State and Central government provides job opportunities.
- **Careers in Indian Navy:** The Indian Navy is the seventh largest in the world and is a well knit, cohesive fighting force with tri dimensional capabilities. The Indian Navy provides you all the training you need and help you make the most of what you have your talents, your skills, your spirit and your aspirations. You get very challenging job and get chance to travel widely.

## Equivalent Courses

<b>Semester III</b>	
<b>Old Courses</b>	<b>New Courses</b>
Gg. 301: Land Resource Management.	Gg. 301: Geography of Resources.
Gg. 302: Water Resource Management.	Gg. 302: Fundamental of Remote Sensing.
Gg. 303: Geoinformatics - II	Gg. 303: Fundamental of Geographical Information System & GPS.
Gg. 304: Practical's in Remote Sensing, GIS & GPS.	Gg. 304: Practical's in Remote Sensing and Image Processing.
Gg. 305: Field Application and Interpretation of Topographical Maps, Aerial Photographs and Satellite imageries.	Gg. 305: Practical's in GIS & GPS Techniques with Help of Computer.
<b>Semester IV</b>	
Gg. 401: Disaster Management and Hazards Mitigation.	Gg. 401: Watershed Management and Planning.
Gg. 402: Soil Resource Management.	Gg. 402: Agricultural Geography.
Gg. 403: Tourism and Travel Management.	Gg. 403: Regional Geography of India and Maharashtra.
Gg. 404: Surveying & Excursion.	Gg. 404: Instrumentation and Surveying.
Gg. 405: Project Report.	Gg. 405: Project Work and Dissertation.

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M.A. / M.Sc. APPLIED GEOGRAPHY**

**New Syllabus**

**SEMESTER III & IV**

**W. E. F. JUNE 2014-15**

**Semester III**

- Gg. 301: Geography of Resources.
- Gg. 302: Fundamental of Remote Sensing.
- Gg. 303: Fundamental of Geographical Information System & GPS.
- Gg. 304: Practical's in Remote Sensing and Image Processing.
- Gg. 305: Practical's in GIS & GPS Techniques with Help of Computer.
- Gg. 306: Tutorials/ Seminar - I

**Semester IV**

- Gg. 401: Watershed Management and Planning.
- Gg. 402: Agricultural Geography.
- Gg. 403: Regional Geography of India and Maharashtra.
- Gg. 404: Instrumentation and Surveying.
- Gg. 405: Project Work and Dissertation.
- Gg. 406: Tutorials / Seminar - II

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SYLLABUS  
Semester III  
(w. e .f. June 2014-15)

**Gg. 301: Geography of Resources.**

Unit No.	Title	Periods
1	<p><b>A) Introduction to Resource Geography -</b>                      a) Meaning and Definition of Resource.                      b) Importance of study of resources.                      c) Components of resources, natural and human.</p> <p><b>B) Classification of Resources -</b>                      a) Basis of Classification: renewable and non-renewable resources.                      b) Importance of biotic and abiotic renewable resources.                      c) Importance of biotic and abiotic non-renewable resources.</p>	12
2	<p><b>A) Forest Resources -</b>                      a) Use of forest resources.                      b) Environmental significance of forests.                      c) Distribution of Forest resources in Maharashtra and India.                      d) Meaning causes, significance and utilization of forest and effects of deforestation.                      e) Remedial measures to conserve forest resources.                      f) Methods of conservation of Forest resources.</p> <p><b>B) Water Resources -</b>                      a) Water as a resource.                      b) Sources of water, significance and utilization of water resources.                      c) Distribution of water resources in Maharashtra and India.                      d) Uses of water resources –                      i) domestic, ii) agriculture, iii) industry, iv) transportation, v) tourism etc.                      e) Methods of conservation of water resources.</p> <p><b>C) Land Resources -</b>                      a) Significance and utilization of land resources.                      b) Distribution of land resources in Maharashtra and India.                      c) Use of land resources: agriculture, forest, mining, settlements &amp; other.                      d) Land degradation due to agriculture, mining and deforestation.                      e) Methods of conservation of land resources.</p>	12
3	<p><b>A) Mineral Resources -</b>                      a) World distribution and production of iron ore, bauxite in major Countries.                      b) Distribution and production of iron ore, bauxite in India.                      c) Distribution and production of iron ore, bauxite in Maharashtra.</p> <p><b>B) Energy Resources -</b>                      a) Distribution and production of coal, petroleum and natural gas in World, India &amp; Maharashtra.                      b) Significance and utilization of solar, wind and nuclear energy resources in World, India and Maharashtra.</p> <p><b>C) Human Resources -</b>                      a) Population as resource.</p>	12

	b) World distribution of population. c) Population distribution in India. d) Population distribution in Maharashtra. e) Concepts of over, optimum and under population.	
4	<b>Resources and Economic development –</b> with reference to Maharashtra and India. a) Role of land resources in economic development. b) Role of water resources in economic development. c) Role of mineral resources in economic development. d) Role of energy resources in economic development. e) Role of human resources in economic development.	12
5	<b>Planning and Management of Resources.</b> a) Concept of resource planning. b) Need of resource planning. c) Resource planning with reference to Maharashtra and India.	12
<b>Total Periods</b>		60

#### Reference Books

1. **Chempremave J. D.** (1989) : Geography and Energy, Longman Scientific and Technical Series. U. K.
  2. **Daji J. A., Kadam J. R. and Patil, N. D.** (1996) : A Textbook of Soil Science, Media Promoters & Publishers Pvt. Ltd. Bombay.
  3. **Gurjar & Jat** (2008): Geography of Water Resources, Rawat Publications, Jaipur.
  4. **Negi B. S.** (1997) : Geography of Resources, Kedarnath Ramnath, Meerut.
  5. **Owen S. and Owens P.L.** (1991) : Environment Resources and Conservation, Cambridge University Press, New York.
  6. **Ray S.** (2008) : Natural Resources, Organization & Technology Linkages, Rawat Publication, Jaipur.
  7. **Saxena H. M.** (2006) : Environmental Geography, Rawat Publications, Jaipur.
  8. **Singh S.** (2004) : Environmental Geography, Prayag Pustak Bhawan, Allahabad.
  9. **Skinner B. J.** (1969) : Earth Resources, Prentice-Hall, Englewood Cliffs, N. J.
  10. **World Resources Institute (WRI)** 1994: World Resources 1994-95, Oxford University Press, New York.
  11. **Zimmerman E. W.** (1951) : World Resources & Industries.
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SYLLABUS  
Semester III  
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**Gg. 302: Fundamental of Remote Sensing.**

Unit No.	Title	Periods
1	<b>Introduction:</b> History and Concepts, Advantages of Remote Sensing over conventional aerial photography - Data acquisition and data analysis - Energy sources and radiation principles, Energy interactions in the atmosphere, energy interactions with the earth surface features, Spectral reflectance of vegetation, soil and water.	12
2	<b>Electromagnetic Spectrum :</b> Electromagnetic Spectrum and characteristics of Wavelength Regions, Energy reflectance Principles and Spectral Signature characteristics, Atmospheric Windows and Absorption Bands, Sensor Characteristics, Spatial, Spectral, Radiometric and Temporal Resolutions. <b>Basic concepts:</b> Visible, Infrared, Thermal and Microwave remote sensing.	12
3	<b>Microwave Remote Sensing:</b> Introduction, Radar development, Side Looking Radars, Geometric characteristics of SLAR imagery - Earth surface feature characteristics influencing radar returns, image signatures and polarization.	12
4	<b>Earth Resource Satellites:</b> Introduction, early history of space imaging, platforms (ground, aerial and space) and sensors - Indian Remote Sensing Programs: Aryabhata, Bhaskara I and II programs, IRS satellite missions and their capabilities - Overview and scope of the future IRS Missions.	12
5	<b>Techniques of interpretation:</b> Aerial photo interpretation, satellite image interpretation, Recognition elements: Tone, Colour, Texture, Pattern, Shape, Size and associated features	12
<b>Total Periods</b>		60

**Reference Books**

1. **Virginia (1966) :** Manual of Photogrammetry (3rd ed.), American Society of Photogrammetry.
2. **Virginia (1975) :** Manual of Remote Sensing, American Society of Photogrammetry.
3. **Avery, T. E. and G. L. Berlin (1983, 1992):** Fundamentals of Remote Sensing and Airphoto Interpretation, 5th ed., MacMillan Publishing Co. New York.
4. **Curran, P. J. (1988) :** Principles of Remote Sensing, Longman, ELBS edition, Hong Kong.
5. **Kellaway, George P. (1956) :** Map Projection, Methuen & Co., London.
6. **Lillesand, T. M., and Kieffer, R. W. (1979) :** Remote Sensing and Image Interpretation, John Wiley and Sons, New York.
7. **Sabins, F. F. (Jr.) (1987) :** Remote Sensing Principles and Interpretation, 2nd ed., W.H. Freeman and Co., New York.
8. **Steers, J. A. (1957) :** Map Projections, University of London Press, London.
9. **Manual of Remote Sensing (1980) :** Vol I and II, American Society of Photogrammetry. 4<sup>th</sup> Ed., Falls

Church,.

10. **Avery, T.E. and G.L. Berlin (1985)** : Interpretation of Aerial Photographs, 4<sup>th</sup> Ed., Bergess Minneapolis, Minn.
11. **Bruno Marcolongo and Franco Mantovani (1997)** : Photogeology and Remote Sensing Applications in Earth Science, Oxford and IBH Pub. Co. Pvt. Ltd., New Delhi.
12. **Pandey S.N. (1987)** : Principles and Applications of Photogeology by, Wiley Eastern.
13. **W.G. Rees (1990)** : Physical Principles of Remote Sensing , Cambridge University Press.
14. **Sabins, F.F. (1986)** : Remote Sensing Principles and Interpretations by, 2<sup>nd</sup> Ed. W.H. Freeman and Company, New York.
15. **Verbyia D. (1995)** : Satellite Remote Sensing for natural resources, Lewis Publishers, Boca Rotaon, F.L.
16. **Wolf P.R. (1983)** : Elements of Photogrammetry, McGraw-Hill, New York.

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SYLLABUS  
Semester III

(w. e. f. June 2014-15)

**Gg. 303: Fundamental of Geographical Information System & GPS.**

Unit No.	Title	Periods
1	<b>Fundamentals of GIS :</b> Concepts and definitions; Evolution and development of GIS; Computer environment for GIS; Elements of spatial data and their graphical representation- Thematic maps; Scales and symbolization; Map projections; spatial data models and data structure in GIS environment - modeling surfaces, networks, terrain, relief and time – virtual maps.	12
2	<b>GIS Technology :</b> Co-ordinate system-basic principles of cartography and computer assisted cartography for GIS; Remote Sensing data as a data source for GIS; Integration of GIS and Remote Sensing-GPS and GIS technology; Creation of location and attribute data bases-Vector and raster formats digitizing and scanning-data editing and validation - geocoding.	12
3	<b>Data analysis and manipulation :</b> Measurement in GIS- classification, overlay analysis and intergradations of data-buffering- shortest path-interpolation-analysis of surfaces and networks; Modeling - physical and environmental processes and human activities; visualization and mapping-forms of output: map, tables, report - Cartographic principles and techniques of graphic representation - inbuilt tools and facilities in a GIS package.	12
4	<b>Application of GIS technology :</b> GIS as decision support system; Application of GIS technology in utilities management and other fields - GIS in land information system, urban management, environmental of management and emergency response system; Adoption of GIS technology in India; GIS project designing and implementation, Future prospects of GIS.	12
5	<b>Introduction of GPS :</b> Overview of GPS technology, GPS receivers', Basic geodesy, Surveying, Satellite constellation, Satellite signals & data, Single point positioning, Measuring distance & timing, GPS accuracy, Error corrections, Differential GPS, GLONASS & GALILEO systems, Application of GPS, Carrying out GPS survey.	12
<b>Total Periods</b>		60

**Reference Books:**

1. **Chang, Kang - Tsung (2008) :** Introduction to Geographic Information Systems, 4th ed., Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. **DeMeers, Michael N.(2005) :** Fundamentals of Geographic Information Systems, 3rd. ed., John Wiley & Sons, Toronto.
3. **Fazal, S. (2008) :** GIS Basics, New Age International Publishers, New Delhi.

4. **Fazal, S. and Rahman, A. (2007)** : Geographic Information System (GIS) Terminology, New Age International Publishers, New Delhi.
5. **Heywood, Ian Cornelius, Sarah and Steve Carver. (2006)** : An Introduction to Geographical Information Systems, 2nd ed., Pearson Education Limited, Toronto.
6. **Siddiqui, M.A. (2006)** : Introduction to Geographical Information Systems, Sharda Pustak Bhavan, Allahabad.
7. **Aronoff, S. (1992)** : Geographic Information Systems : A Management Perspective, WDL Publications Ottawa, Canada.
8. **Burrough, Peter A. and Rachael A. McDonnell. (1998)** : Principles of Geographical Information Systems, Oxford University Press, Toronto.
9. **ESRI (1990)** : Understanding GIS, Environmental Systems Research Institute, U.S.A., 1993. 4. Jeffrey, S. & John, E. : Geographic Information Systems – An Introduction, Prentice Hall, New Jersey, USA.
10. **Lo, C.P and Albert K.W., Yeung (2007)** : Concepts and Techniques of Geographic Information Systems, 2nd ed., Pearson Education Inc., Toronto, Canada.
11. **Longley, Paul A., Goodchild, Michael F. Maguire, David J., and David W. Rhind. (2005)** : Geographic Information Systems and Science, 2nd ed., John Wiley and Sons, England.
12. **S. Aronoff (1989)** : Geographic Information Systems: A Management Perspective, D. D. L. Publication, Ottawa.
13. **P. A. Burrough (1986)** : Principles of Geographic Information Systems for Land Resource Assessment, Oxford University Press, New York.
14. **D. R. Fraser, Taylor (1991)** : Geographic Information Systems, Pergaman Press, Oxford.
15. **Marks S. Monmonier (1982)** : Computer- Assisted Cartography, Prentice Hall, Englewood Cliff, New Jersey.
16. **I. Heywood et al (2002)** : An Introduction to Geographical Systems, Pearson Education Ltd, New Delhi.
17. **David Martin (1996)** : Geographical Information Systems: Socio-Economic Application, IInd Edition, Routledge, London & New York.
18. **William E. Huxhold** : An Introduction to Urban Geographic Information Systems, Oxford University Press, New York.
19. **John Pickles (1995)** : Ground Truth: The Social Implications of Geographical Information Systems, the Guilford Press, New York, 1995.

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SYLLABUS  
Semester III

(w. e. f. June 2014-15)

**Gg. 304: Practical's in Remote Sensing and Image Processing.**

Unit No.	Title	Periods
1	<b>Photogrammetry –</b> Stereoscopic Vision Test Format and stereoscopic Orientation of Aerial Photographs Determination of scale and Stereoscopic area Determination of Principal Point and Conjugate Principal Point Direction of Flight line and Air Base. Calculation of traffic Speed through Aerial Photographs Calculation of Photographic coverage for a Planning Area	12
2	<b>Photogrammetry –</b> Height Determination Methods Mapping Land Use change Detection Land use Measurement Methods Preparation of Land cover and Land use Map Interpretation of Aerial Photographs Population Census with Aerial Photographs	12
3	<b>Image Processing -</b> - Image interpretation, basic principle, factors governing quality of images, elements of image interpretation and techniques of image interpretation. - Use of multiple images in image interpretation, seasonal differences on images, comparisons of seasonal images, winter and summer images.	12
4	<b>Image Processing -</b> - Thermal infrared images; thermal processes and properties, heat, temperature and radiant flux, IR region of the electromagnetic spectrum, IR detection and imaging technology, characteristics of IR images, advantages of thermal imagery.	12
5	<b>Image Processing -</b> - Introduction of image processing, farms of mages, different image processing techniques, computer image processing, digital image processing, image restoration image enhancement, edge enhancement, ratio images.	12
<b>Total Periods</b>		<b>60</b>

**Reference Books**

1. **Virginia (1966)** : Manual of Photogrammetry (3rd ed.), American Society of Photogrammetry.
2. **Virginia (1975)** : Manual of Remote Sensing, American Society of Photogrammetry.
3. **Avery, T. E. and G. L. Berlin** : Fundamentals of Remote Sensing and Airphoto Interpretation, 5th ed., New York, MacMillan Publishing Co., 1983, 1992.
4. **Curran, P. J.** : Principles of Remote Sensing, Longman, ELBS edition, Hong Kong, 1988.
5. **Kellaway, George P.** : Map Projection, Methuen & Co., London, 1956.
6. **Lillesand, T. M., and Kieffer, R. W.** : Remote Sensing and Image Interpretation, John Wiley and Sons, New York, 1979.

7. **Sabins, F. F. (Jr.)** : Remote Sensing Principles and Interpretation, 2nd ed., W.H. Freeman and Co., New York, 1987.
8. **Steers, J. A.** : Map Projections, University of London Press, London, 1957.

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SYLLABUS  
Semester III

(w. e. f. June 2014-15)

**Gg. 305: Practical's in GIS & GPS Techniques with Help of Computer.**

Unit No.	Title	Periods
1	<p><b>Introduction to GIS</b>                      a) Introduction to GIS software ILWIS and Arc GIS and GPS etc.                      b) Applications of ILWIS software -                      Introduction to Menu, main windows, tools, navigation bar, catalogue, operation tree, command box, domain and attribute tables.                      c) Introduction of GPS, data collection and mapping by using GPS Software.</p>	12
2	<p><b>Applications of ILWIS software -</b>  <b>Geo-referencing</b>                      a) Import scanned/digital image                      b) Coordinate system                      c) Geo-referencing  <b>Creation of layers</b>                      a) Concepts: point, segment and polygon layers                      b) Point layers: Settlements and Wells                      c) Segments layers: Contours, boundaries, rivers and roads                      d) Polygon layers: village, farm and forest  <b>Attribute data</b>                      Tabulation and attachments</p>	12
3	<p><b>Applications of ArcGIS software -</b>                      Introduction to Menu, main windows, tools, navigation bar, catalogue, operation tree, command box, domain and attribute tables.</p>	12
4	<p><b>Applications of ArcGIS software -</b>  <b>Geo-referencing -</b>                      a) Import scanned/digital image                      b) Coordinate system                      c) Geo-referencing  <b>Creation of layers</b>                      a) Concepts: point, segment and polygon layers                      b) Point layers: Settlements and Wells                      c) Segments layers: Contours, boundaries, rivers and roads                      d) Polygon layers: village, farm and forest  <b>Attribute data</b>                      Tabulation and attachments</p>	12
5	<p><b>Applications of GIS Software -</b>                      a) Mapping                      b) Interpolation                      c) Classification  <b>Applications of GIS Software in Geographical fields –</b>                      a) Applications of GIS Software for land management –</p>	12

b) Applications of GIS Software for resource management – c) Applications of GIS Software for water management - d) Applications of GIS Software for rural & urban planning management -	
<b>Total Periods</b>	60

**Reference Books:**

1. Lillesand, Thomas M. & Kiefer Ralph (2000) : Remote Sensing and Image interpretation, John Wiley.
2. Agarwal C.S. and Garg P.K. (2002) : Text Book on Remote Sensing, Wheeler Publishing New Delhi.
3. Prithvish Nag and M. Kudrat (1998) : Digital remote Sensing , Concept Publishing Company, New Delhi.
4. William Jonathan (1995) : Geographic information from Space : Processing and applications of Geocoded Satellite Images, John Wiley & Sons.
5. Taylor and Francis (1996) : Spatial analytical on GIS DeBarry ,Paul A. (1999) GIS Modules and Distributed Models of the Watershed: A Report from ASCE Task Committee on GIS Modules and Distribution, ASCE.
6. Burrough, P.A. (1986) : Principles of Geographical information System for Land Resources Assessment, Oxford University Press.
7. Environment System Research Institute (1993) : Understanding GIS , The Arc Info Method.
8. Bernhardsen, Tor (1999) : Geographic Information System, An Introduction, John Wiley & Sons.
9. Clarke ,Keith C. (1999) : Getting Started with Geographic Information System , Prentice Hall.
10. Demers, Michael N. (2000) : Fundamentals of Geographic Information System ,John Wiley.
11. Haywood, Ian (2000) : Geographical Information System, Longman.
12. Chang, Kang-taung (2000) Introduction to Geographic information System, Tata McGraw Hill.

APPLIED GEOGRAPHY

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**M.A. / M.Sc. APPLIED GEOGRAPHY**

**New Syllabus**

**SEMESTER IV**

**W. E. F. JUNE 2014-15**

**Semester IV**

- Gg. 401: Watershed Management and Planning.
- Gg. 402: Agricultural Geography.
- Gg. 403: Regional Geography of India and Maharashtra.
- Gg. 404: Instrumentation and Surveying.
- Gg. 405: Project Work and Dissertation.
- Gg. 406: Tutorials / Seminar.

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**Gg. 401: Watershed Management and Planning.**

Unit No.	Title	Periods
1	<p><b>Introduction To Watershed –</b></p> <p>a) Concept of watershed, characteristic of watershed and classification of watershed.</p> <p>b) Significance of watershed development.</p> <p>c) Demarcation of watershed</p> <p>d) Types of watershed according to area and shape.</p>	12
2	<p><b>Physical parameters of watershed –</b></p> <p><b>A) Channel geometry &amp; basin morphology:</b></p> <p>a) Hydraulic geometry at channel cross section &amp; along the channel.</p> <p>b) Channel cross section pattern.</p> <p>c) Channel types.</p> <p><b>B) Basin morphology:</b></p> <p>a) Drainage network &amp; watershed boundary.</p> <p>b) Drainage frequency, drainage density &amp; constant of channel maintenance.</p> <p>c) Basin morphology.</p> <p>i) Horton's form factor.</p> <p>ii) Millar's circularity ratio.</p> <p>iii) Schumm's elongation ratio.</p> <p>iv) Strahler's ruggedness index.</p> <p>v) Strahler's hypsometric integral.</p> <p><b>C) Landuse:</b></p> <p>a) Measurement &amp; data sources.</p> <p>b) Use of land:</p> <p>i) Total geographical area.</p> <p>ii) Area under forest.</p> <p>iii) Area under agricultural.</p> <p>iv) Area under cultural waste.</p> <p>v) Area under natural waste.</p> <p><b>D) Terrain analysis:</b></p> <p>Terrain analysis on the basis of -</p> <p>i) Relief characteristics.</p> <p>ii) Slope.</p> <p>iii) Dissection index.</p> <p>iv) Drainage characteristics: Spatial distribution of drainage frequency and drainage density.</p> <p>v) Soil</p>	12
3	<p><b>Hydrological parameters –</b></p> <p><b>A) Rainfall:</b> a) Intensity &amp; duration, b) Measurements.</p> <p><b>B) Aerial precipitation:</b> a) Thiessen polygons, b) Isohytal method.</p>	12



	<p><b>C) Evaporation &amp; transpiration:</b> a) Methods, b) Instruments.  <b>D) Infiltration:</b> a) Methods, b) Instruments  <b>E) Run off:</b> a) Measurement, b) Selection, criteria of gouging station.  <b>F) Discharge:</b> a) Measurements, b) Unit hydrograph.</p>	
4	<p><b>A) Ground Water –</b>  i) Definition  ii) Aquifer types  iii) Water table  iv) Porosity  v) Ground water movement  vi) Recharge &amp; discharge  <b>B) Water management:</b>  a) Rainwater harvesting.  b) Percolation tanks &amp; pits.  c) Sprinkle irrigation.  <b>C) Development programmes:</b>  a) Artificial recharge of ground water.  b) Dams &amp; weirs.  c) Interlinking of rivers.</p>	12
5	<p><b>Sample of Watershed Management and Planning –</b>  <b>A) Types of Survey for watershed development</b>  i) Physical survey  ii) Hydrological  iii) Land use  iv) Survey of Resources  <b>B) Advance Techniques for watershed development</b>  i) Remote sensing data analysis  ii) Application of GIS software</p>	12
<b>Total Periods</b>		60

#### Reference Books

1. **Murthy J.V.S.** (1994) : Watershed Management in India, Wiley Eastern Ltd. New Delhi.
2. **Paranjape S. and Other** (1980) : Water based Development, Bharat Gyan Vigyan Samithi, New Delhi.
3. **Mutreja K.N.** (1990) : Applied Hydrology, Tata Mc Graw Hill Pub. Co. Ltd. New Delhi.
4. **Shing R.J.** (2000) : Watershed planning and Management, Yash Publishing House, Bikaner.
5. **Chanda B., Dattaa D., Mujumdar** (2001) : Digital Image Processing and Analysis, Prentice- Hall of India.
6. **Prithvish Nag and M. Kudrat** (1998) : Digital Remote Sensing , Concept Publishing Co. New Delhi-
7. **Basudeb Bhatta:** Remote Sensing and GIS, 2nd ed., Oxford university press, Printed by-Radha press, New Delhi.
8. **M. Anji Reddy:** Text book of Remote Sensing and GIS, 3rd Ed., BS Publications, Hydrabad.

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M.A. /M.Sc. APPLIED GEOGRAPHY  
SYLLABUS  
Semester IV  
(w. e. f. June 2014-14)

**Gg. 402: Agricultural Geography.**

Unit No.	Title	Periods
1	<p><b>Introduction to Agricultural Geography –</b> Definition, Nature, Scope and Approaches, Origin and dispersal of agriculture, significance and development of agricultural geography. Approaches to the study of agricultural geography - Environmental, Regional, Commodity and Behavioral approach Significance of Agriculture - Place of agriculture in Different Economies – Significance of agriculture in world regions, Importance of agriculture in the Indian Economy.</p>	12
2	<p><b>A) Fundamental concepts in agricultural geography – Meaning and explanation.</b> 1) Crops : i) Cropping pattern, ii) Crop rotation, iii) Intensity of cropping, iv) Crop concentration, v) Crop diversification, vi) Crop combination. 2) Agricultural Production and Development : i) Agricultural efficiency, ii) Agricultural productivity, iii) Agricultural labor productivity, iv) Marginal land, v) Agricultural development, vi) Sustainable Agricultural development. <b>B) Determinants of Agricultural Patterns –</b> Influence of Physical, Economic and Technological Factors. 1. Altitude, Relief, Climate, Soil - 2. Size of Land holding, 3. Land Tenancy, 4. Marketing facilities - 5. Transport - 6. Irrigation - 7. Mechanization and Equipments - 8. Biochemical inputs – 9. Government policies – 10. Capital and Labor – 11. Religion -</p>	12
3	<p><b>A) Agricultural Types and Characteristics –</b> Study of the following types of agriculture in respect of areas, salient features and their problems - 1. Shifting cultivation 2. Intensive subsistent farming. 3. Mixed farming 4. Plantation agriculture 5. Commercial grain farming 6. Dairy farming</p>	12
4	<p><b>A) Land Use Concepts –</b></p>	12

	<p>1. General Land use, 2. Agricultural Land use, 3. Arable land, 4. Net sown area, 5. Gross cropped area, 6. Land reform and 7. Land tenure -</p> <p><b>B) Agricultural Statistics &amp; Land use Survey techniques -</b> Sources of agricultural statistics -</p> <p>i) Primary Sources of Agricultural data (observation, interview, questionnaire &amp; schedule)</p> <p>ii) Secondary Sources of agricultural data ( Indian Agricultural Statistics, Agricultural seasons and crop reports, crop statistics, irrigation statistics, agricultural prices, World Agricultural Statistics &amp; other statistics)</p> <p><b>C) Land Classification in India and Maharashtra –</b></p>	
5	<p><b>A) Agricultural regionalization Methods of Regionalization -</b></p> <p>1. Views of Baker Whittles Hann.</p> <p>2. Crop combination techniques - Weaver and Thomas method.</p> <p>3. Agricultural efficiency - Kendall's ranking coefficient, Bhatia's method.</p> <p>4. Agricultural location models: Von Thunen and Losch Models &amp; its modifications.</p> <p>5. Agricultural regions of India.</p> <p><b>B) Problems &amp; Prospects of Agriculture in India -</b> Semi-arid &amp; arid regions in India</p> <p>1. Definition and characteristics of arid and semi-arid regions.</p> <p>2. Droughts and famines</p> <p>3. Role of irrigation and dry farming.</p> <p><b>C) Contemporary Issues In Indian Agriculture -</b></p> <p>1. Nutrition, Malnutrition and Hunger;</p> <p>2. Rural poverty and unemployment;</p> <p>3. Poverty alleviation strategies;</p> <p>4. Food aid and nutrition programmes;</p> <p>5. Food security and its components.</p>	12
<b>Total Periods</b>		60

#### Reference Books

1. Singh. J. & Dhillon S.S. (1994) – Agricultural Geography, Tata McGraw Hill, Publishing Co. Ltd.
2. Grigg. D.G. (1964) – An Introduction to Agricultural Geography Hutchinson & Co.Ltd.,
3. Morgan. W.B. & S.C. Monton (1971) – Agricultural Geography Methuen, London.
4. Symons Leslie (1970) – Agricultural Geography, G. Belt and Sons Ltd., London.
5. Tarrent, J. R. (1970) – Agricultural Geography, David and Charles, Newton Abbot.
6. Grigg. D. G. (1974) – The Agricultural Systems of the world An Evolutionary Approach.
7. Illbery, B.W. (1985) – Agricultural Geography, Social & Economic Analysis, Oxford University Press.
8. Husain M. (1979) : Agricultural Geography; Inter India Publishers; New Delhi.
9. Randhawa M. S. (1980) – An History of Agriculture in India Vols. I, II, III,IV ICAR, New Delhi.
10. Majid Husain (2010) – Systematic Agricultural Geography , Rawat Publications, Jaipur.
11. Grigg, D. B. (1974.) : The Agricultural Systems of the World. Cambridge University Press, New York.
12. Morgan, W.B. (1978) : Agriculture in the Third World - A Spatial Analysis. West view Press, Boulder.
13. Tarrant, J. R. (1974.) : Agricultural Geography. Wiley, New York.

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SYLLABUS  
Semester IV  
(w. e. f. - June 2014-15)

**Gg. 403: Regional Geography of India and Maharashtra.**

Unit No.	Title	Periods
1	<b>India in the context of Southeast and South Asia; India:</b> (With reference to Maharashtra) Land of diversities; unity within diversities, Major terrain elements of India and their role in shaping physical landscape of India. Drainage systems of India and their functional significance. The morphological regions of India.	12
2	<b>Regional and Seasonal variations of Climate :</b> (With reference to Maharashtra) The monsoon, western disturbance, norwesters, Climatic regions of India. Soil types of India-their distribution and characteristics; Vegetation types and their distribution, Forests, Minerals and Power resources - The status of their use and need for conservation.	12
3	<b>Spatial distribution :</b> (With reference to Maharashtra) Spatial distribution of population and density; socio-economic implications of population explosion; urbanization, changing nature of Indian economy. Agricultural growth during the plan period; Green Revolution vis-à-vis traditional farming; regionalization of Indian agriculture, and typology of agricultural regions and their relevance in agricultural development planning. Industrial development and Indian economy; industrial regions of India and their industrial structure, composition of domestic and international trade.	12
4	<b>Basis of regional divisions of India :</b> (With reference to Maharashtra) Macro, meso and micro - regions of India – their comparative analysis. Resource Regions of India, regional planning of rural and urban regions.	12
5	<b>Contemporary issues:</b> (With reference to Maharashtra) Regional disparity; poverty, population explosion, globalization, Impact of development on Environment, social and ethnic tension; gender discrimination and empowerment of women.	12
<b>Total Periods</b>		60

**Reference Books:**

1. **Deshpande C.D.** (1992) : India-A Regional Interpretation Northern Book Centre, New Delhi.
2. **Farmer, B.H.** (1983) : An Introduction to South Asia. Methuen, London.
3. **Govt. of India** (2001): India - Reference Annual, 2001 Pub. Div, New Delhi.
4. **Govt. of India:** National Atlas of India, NATMO Publication, Calcutta.
5. **Govt. of India** (1965): The Gazetteer of India. Vol I & III Publication Division, New Delhi.

6. **Learmonth, A.T.A.** : Man and Land of South Asia Concept, New Delhi.
7. **Mitra, A.** (1967) : Levels of Regional Development India Census of India, Vol - I, Part I- (i) and (ii) New Delhi.
8. **Routray, J.K.** (1993) : Geography of Regional Disparity Asian Institute of Technology, Bangkok.
9. **Shafi, M.** (2000): Geography of South Asia, McMillan & Co., Calcutta.
10. **Singh, R.L.** (1971) : India: A Regional Geography, National Geographical Society, Varanasi, India.
11. **Spate, O.H.K. and Learmonth, A.T.A.** (1967) : India and Pakistan - Land, People and Economy Methuen & Co., London.
12. **Valdiya, K.S.** (1998) : Dynamic Himalaya, University Press, Hyderabad.
13. **Wadia, D.N.** (1967) : Geology of India, McMillan & Co., London.

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(w. e. f. June 2014-15)

**Gg. 404: Instrumentation and Surveying.**

Unit No.	Title	Periods
1	<p><b>Surveying:</b> Meaning and definition, Types of surveying, Characteristics, Importance and application in various sectors.</p> <p><b>A) Plane Table Survey -</b> i) Equipments required for plane table survey ii) Plane table survey-Radiation and Intersection method.</p> <p><b>B) Prismatic Compass Survey -</b> i) Systems of expressing bearing- 1) Whole circle System 2) Quadrant system. ii) Prismatic compass traverse methods- 1) Open Traverse 2) Closed Traverse. iii) Correction of bearing and closing of error by Bowditch method.</p> <p><b>C) Chain-Tape Survey -</b> i) Equipments required for chain - tape survey ii) Methods for chain – tape Survey</p> <p><b>D) Geodetic Surveying -</b> Definition and methods, triangulation, benchmarks, spot heights and reduced levels, interpolation, contouring.</p>	12
2	<p><b>Theodolite –</b> The Instrument, types, advantages and disadvantages and application of Theodolite. 1. Various components and least count of the instrument. 2. Methods of surveying and preparation of at least two contour maps by intersection and tachometry</p>	12
3	<p><b>Dumpy level –</b> The instrument, types, advantages and disadvantages and application of Dumpy Level. 1. Various components: Methods of surveying and leveling. 2. Field surveying and leveling by Colimation and rise and fall method and block contouring.</p>	12
4	<p><b>Advance Surveying techniques - Total Station –</b> The instrument, types, advantages and disadvantages and application of Total Station. 1. Various components, methods of surveying. 2. Leveling, Centering and Station setup- 3. Data Collection – 4. Stakeout and Demarcation – 5. Post processing by using any supported GIS software.</p>	12
5	<p><b>Advance Surveying techniques -</b> <b>A) Global Positioning System (GPS) –</b></p>	12

Introduction GPS, Components of GPS, Application of GPS and Data collection, Prepare map using Surfer Software. <b>B) Differential Global Positioning System (DGPS) –</b> The instrument, types, advantages and disadvantages and application of DGPS. <b>C) Remote Sensing Survey –</b> Aerial photography and satellite imageries -	
<b>Total Periods</b>	60

#### Reference Books

- 1) **Gopal Singh:** Map Work and Practical Geography, Vikas publishing house, New Delhi.
- 2) **Kanatkar T. P. and Kulkarni S.V. :** Surveying and Leveling, Pune vidyarthi griha prakashan, pune.
- 3) **Davis, R.E. and Foote, F.S. (1953) :** Surveying, McGraw-Hill Book Co. New York.
- 4) **Deshpande, G.B.(1991) :** Surveying, Everest publishing house, pune.
- 5) **Khan M.Z. (1998):** Text book of Practical Geography, concept publishing company, New Delhi.
- 7) **Sing R.L. & Singh R.P. (1993) :** Elements of Practical Geography, Kalyani Publisher, New Delhi.

APPLIED GEOGRAPHY

NORTH MAHARASHTRA UNIVERSITY, JALGAON  
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**Gg. 405: Project Work and Dissertation.**

Unit No.	Title	Periods
1	<p><b>Research Techniques and Methodology -</b></p> <p>a) Introduction to Project Report                      b) Selection of Topic, sources of data collection and types of data                      c) Data feeding techniques                      d) Research techniques and methodology                      e) Data Analysis techniques                      f) Cartographic techniques                      g) Guidance for report writing, checking and to prepare the students for examination                      h) Total five Seminars (two hours per seminar) of students on selected topic and guidance to develop the communication skill of the students</p>	12
2	<p><b>Students should prepare individual project report on any one topic from the list of the following subjects with the help of concern guide:</b></p> <p><b>a) Physical Geography –</b>                      i) Geomorphology, ii) Climatology, iii) Oceanography, iv) Soil Geography, v) Environmental Geography, vi) Plant Geography, vii) Animal Geography, viii) Bio-Geography or any other related to Physical Geography.</p> <p><b>B) Human Geography –</b>  <u>i) Economic Geography –</u>                      a) Agriculture Geography, b) Resources Geography, c) Industrial Geography, d) Trade and Transport Geography, e) Travel and Tourism Geography, f) Commercial Geography, g) Marketing Geography, h) Regional Geography.  <u>ii) Social Geography –</u>                      a) Population Geography, b) Settlement Geography, c) Social Geography, d) Cultural Geography, e) Rural Geography, f) Urban Geography, g) Geography of Health, h) Criminal Geography, i) Behavioral Geography.</p> <p><b>C) Analytical Techniques in Geography -</b>                      i) Cartography, ii) GIS and Computer mapping, iii) Remote Sensing Techniques, iv) Quantitative Techniques.</p>	12
3	<p><b>While preparing the project students should follow the guidelines cited as below :</b></p> <p>a) Research methodology should be adopted.                      b) Data should be analyzed through M.S. Excel worksheet or Access, Minitab, SPSS for data calculation.                      c) All maps should be prepared by using GIS Software.                      d) At list 10 maps and necessary diagrams should be prepared</p>	12
4	<p><b>Submission of Project Report:</b></p> <p>a) Student will prepare three printed copies of their project report.                      b) Submit two printed copies of project along with two CDs of project report</p>	12



	<p>in PDF format and PPT of presentation to department <b>Eight days</b> before the practical examination.</p> <p>c) Submit hard copy of raw data used for project report.</p>	
5	<p><b>Examination System:</b></p> <p>a) At the time of examination student will present the project with the help of PowerPoint.</p> <p>b) Student will interface the questions asked by examiners and participants</p> <p>c) All students are allowed to attend the open defense viva at the time of examination.</p> <p><b>Note:</b> Manual data analysis &amp; mapping will not be entertained.</p> <p><b>Marking System:</b></p> <p>A) Internal Assessment and performance of student ----- 40 marks</p> <p>B) External examination----- 60 marks</p> <p>a) Project Report----- 40 marks</p> <p>b) Project Presentation----- 20 marks</p> <p><b>a) Project Report:</b></p> <p>i) Research methodology and techniques adopted----- 10 marks</p> <p>ii) Maps and Diagrams ----- 20 marks</p> <p>iii) Preparation and set-up of Project report----- 10 marks</p> <p><b>b) Project Presentation:</b></p> <p>i) General performance of Student ----- 04 marks</p> <p>ii) Map Interpretation ----- 04 marks</p> <p>iii) Data presentation techniques----- 04 marks</p> <p>iv) Preparation of slides and animation techniques----- 04 marks</p> <p>iv) Oral and presentation skill ----- 04 marks</p>	12
<b>Total Periods</b>		60