Accredited By NAAC with 'A' Grade

Revised Syllabus For

M.A./Master of Science

Part- II

Geography

CBCS PATTERN

Syllabus to be implemented from

June, 2019 onwards.

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A) Ordinance and Regulations

B) Shivaji University, Kolhapur, New/ Revised Syllabus for Master of **Science and Technology**

1. **Title of the Course:** M.A./M.Sc. Geography
2. **Faculty:** Faculty of Science and Technology
3. **Year of Implementation:** New syllabus will be implemented from June 2018 onwards
4. **Preamble:**

   Total semesters – 04 (two semester per year)
   Total theory papers – 16 (per semester – 04)
   Total practical/Project papers – 08 (per semester – 02)
5. **General Objectives of the Course:**
   - To inculcate the fundamental knowledge of Geography and develop research attitude among the students
   - To develop the ability of making comprehensive analysis, interpret spatial problem, suggest proper solutions by using theoretical, methodological and instrumental knowledge of Geography.
   - To generate employability skills among the Geography students.
   - To guide students about proper utilization of natural resources through Geographical knowledge.
   - To create awareness among the students about the regional and national environmental issues
   - To create awareness among the students about recent trends and advanced technology in the field of Geography.
6. **Course Duration:**

   The M.A./M.Sc course duration is of two years comprising of four semesters, each semester spanning for 6 months of minimum 120 working days.

   Period of Course:

   Semester I & III - June to November

   Semester II & IV- December to May
7. **Course Pattern: CBCS**
8. **Fee Structure:**As per University Rules and Regulations
9. **Eligibility of Course**:

   Admission will be open to candidates passing B.A./B.Sc. degree in Geography, Geology, Environment Science form Shivaji University or any other statutory university.

   Selection Procedure:

   In the selection procedure 50% weightage will be given to entrance examination conducted by Shivaji University, Kolhapur and remaining 50% weightage will be given to the aggregate marks obtained at B.A./B.Sc. examination. The merit list of eligible candidates will be displayed on Shivaji University web site: www.unishivaji.ac.in
10. **Medium of Instruction:** English
11. **Structure of Course:**

Shivaji University, Kolhapur

Department of Geography

(Revised Syllabus Introduced from June, 2019)

M.A./M.Sc. Geography Course Structure (Credit Based Semester System)

Semester - III

Paper Type	Paper No.	Title
Theory (Core)	GCT-307:	Geohydrology and Oceanography
	GCT-308:	Fundamentals of Remote Sensing and Digital Image Processing
(Optional)	GOT-305:	Geography of Environment
		or
	GOT-306:	Biogeography
	GOT-307:	Settlement Geography
		or
	GOT-308:	Advance Cartography and Surveying
Practical	GCP-305:	Research Methodology in Geography
	GCP-306:	Photogrammetry, Remote Sensing and Digital Image Processing

Semester - IV

Paper Type	Paper No.	Title
Theory (Core)	GCT-409:	Development of Modern Geographical Thought
	GCT-410:	Regional Planning and Development
(Optional)	GOT-409:	Fundamentals of Geographical Information System and Introduction to GPS
		or
	GOT-410:	Fundamentals of Soil Geography
	GOT-411:	Tourism Geography
		or
	GOT-412:	Agricultural Geography
Practical/Project		
	GOP-401:	Introduction to GIS Software and GPS
		or
	GOP-402:	Soil and Water Analysis
	GCP-407:	Dissertation/ Project (Based on field work)
	GCP-408:	Study tour report writing

*GCT = Geography-Core-Theory; GCP = Geography-Core-Practical; GOT = Geography-Optional-Theory

12. Scheme of Teaching and Examination:

Teaching Faculties:

Head of the Department: Prof. S.S. Panhalkar

Teaching Staff: Professor - 03, Associate Professor- 01, Assistant Professor - 06

Non-Teaching Staff:

Clerk - 01, Lab. Assistant - 01, Lab. Attendant - 01, Peon - 01

Scheme of Teaching:

Paper Type	Number of papers/ Semester	Lecture hours /paper/week	Total workload (hours/week)
Theory	04	04	**16**
Practical/Project	02	06	**12**
Total	06	10	**28**

Scheme of Examination:

Paper Type	Internal Marks	Final Exam Marks	Total Marks
Theory	20	80	100
Practical	20	80	100
Project	40	60	100

Note:

1. Internal marks (Theory = 20 marks): Class Test: 10 Marks & Assignment/Seminar: 05 marks, Field visit and Industrial Visit- 05 marks

2. Internal marks (Practical = 20 marks): Practical Assessment: 10 marks & Assignment: 10 marks
3. Internal marks (Project = 40 marks): Project: 30 marks &Presentation: 10 marks
4. Study tour report writing: 20 marks

13. Standard of Passing: 40 Per cent

14. Nature of Question Paper in Final Exam (Theory):

Question No.	Type of Question	Number of Questions to be Asked	Number of Questions to be Answered	Marks per Question	Total Marks
Q1.	Objective type (MCQ)	08	08	02	16
Q2.	Short Answer (Definition type)	04	04	04	16
Q3.	Short Notes (Descriptive type)	03	02	08	16
Q4.	Long Answer/ Essay type	02	01	16	16
Q5.	Long Answer/ Essay type	02	01	16	16
Total = 05	--	--	--	--	**80**

Nature of Question Paper in Final Exam (Practical):

Question No.	Type of Question	Marks per Question	Total Marks
Q1 to Q4	Practical/Lab Assessment	15	60
Q5.	Practical Assignment	10	10
Q6.	Viva-voce	10	10
Total = 06	--	--	**80**

Nature of Question Paper in Final Exam (Project):

Question No.	Type of Question	Marks per Question	Total Marks
Q1 to Q4	Practical	10	40
Q5.	Viva-voce	10	20
Total = 05	--	--	60

Unit-wise weightage of Marks: As per allocation of lectures

15. Equivalence in Accordance with Titles and Contents of Papers (for revised syllabus):

Sr. No.	Title of Old Paper	Title of New Paper
1	GCT-412: Geohydrology & Oceanography	GCT-307: Geohydrology and Oceanography
2	GCT-310: Fundamentals and Applications of Remote Sensing	GCT-308: Fundamentals of Remote Sensing and Digital Image Processing
3	GOT-301: Environmental Geography	GOT-305: Geography of Environment
4	GOT-407: Biogeography	GOT-306: Biogeography
5	GOT-406: Settlement Geography	GOT-307: Settlement Geography
6	Newly Introduced	GOT-308: Advance Cartography and Surveying
7	GCP-407: Research Methodology and Study Tour Report Writing	GCP-305: Research Methodology
8	GCP-305: Photogrammetry, Remote Sensing and GIS	GCP-306: Photogrammetry, Remote Sensing and Digital Image Processing
9	GCT-411: Development of Geographical Thought	GCT-409: Development of Modern Geographical Thought
10	GCT-309: Regional Planning and Development	GCT-410: Regional Planning and Development
11	GOT-303: Surveying, Cartography & GIS	GOT-409: Fundamentals of Geographical Information System and Introduction to GPS
12	Newly Introduced	GOT-410: Fundamentals of Soil Geography
13	GOT-302: Geography of Tourism	GOT-411: Geography of Tourism
14	GOT-405: Agricultural Geography	GOT-412: Agricultural Geography
15	Newly Introduced	GOP-401: Introduction to GIS Software and GPS
16	Newly Introduced	GOP-402: Soil and Water Analysis
17	GCP-408: Project (100 marks)	GCP-407: Dissertation/ Project (Based on field work)

18	GCP-407: Research Methodology and Study Tour Report Writing	GCP-408: Study tour report writing

16. Special Instructions if Any:

C) Other features

1. Intake Capacity/No. of Students

M.A/M.Sc.- I: Total Seats - 50 (including reservation as per the Govt. of Maharashtra)
M.A/M.Sc.- II: Total Seats - 50 (including reservation as per the Govt. of Maharashtra)

2. Library and Laboratory Equipment's

University and Departmental library : Books, Journals, Thesis, etc
Equipments- GPS, DGPS, Theodolite, Total Station, Weather station,etc._

D) General Guidelines – As per University Guidelines

Total Marks/Credit for M.A./M.Sc. Geography Degree:

Nature of Paper	Marks	Credit
Theory papers	1600	64
Practical papers	800	32
Total	2400	96

Semester-III
GCT-307: Geohydrology and Oceanography

Unit-1: Groundwater and Basin Hydrology

Surface and subsurface water resources; Hydrological cycle; Groundwater: Occurrence, movement and management; Groundwater regimes in India and Maharashtra; Hydrological characteristics of aquifers; Basin hydrology: precipitation, evaporation, infiltration and run-off; Unit hydrograph.(14)

Unit-2: Applied Geohydrology

Groundwater exploration and water pollution with special reference to India; Problems related to water use; Fresh and salt water relationship in coastal and inland areas; Conservation and planning for the development of water resources; Watersheds and Wetlands in India.(12)

Unit-3: Geological Oceanography

Origin and evolution of ocean basins: theory of plate tectonics and seafloor spreading; Topography of the ocean floor: continental shelf, slope, rise, submarine channels, hills, ridges, trenches and abyssal plains; Bottom relief of Pacific, Atlantic and Indian Ocean; Origin and evolution of island arcs; Estuarine and coastal processes and landforms.(14)

Unit-4: Physical, Chemical and Biological Oceanography

Air-sea interaction and ocean circulation: currents, waves and tides; Currents of Pacific, Atlantic, and Indian Ocean; Properties of oceanic water: chemical composition, salinity, temperature, and density; Biological productivity in the Ocean; Origin and growth of coral reefs; Ocean deposits: origin, type and distribution; Major water masses of the World's Ocean; Thermohaline circulation and the oceanic conveyor belt; Sea level changes; Oceanic regions; Marine resources; Marine pollution.(20)

References:

1. **Cech, T.V. (2009)**: *Principles of Water Resources: History, Development, Management, and Policy (3rd Ed.)*, Wiley, Hoboken, New Jersey, 576pp.
2. **Chow, V.T.,** Maidment, D.R., and Mays, L.W. **(1988)**: *Applied Hydrology*, McGraw-Hill, New York, 540pp.
3. **Christopherson, R.W. (2012)**: *Geosystems: An Introduction to Physical Geography (8th Ed.)*, Prentice Hall, New Jersey, 693pp.
4. **Davis, R.,** and Fitzgerald, D. **(2003)**: *Beaches and Coasts*, Wiley-Blackwell, Hoboken, New Jersey, 432pp.
5. **Day, T. (2008)**: *Oceans (Rev. Ed.)*, Facts on File, New York, 337pp.
6. **Fitts, C.R. (2002)**: *Groundwater Science*, Academic Press, 450pp.
7. **Garrison, T. (2009)**: *Essentials of Oceanography (5th Ed.)*, Brooks/Cole, Belmont, California, 463pp.
8. **Han, D. (2010)**: *Concise Hydrology*, Dawai Han and Ventus Publishing, 145pp.
9. **Pinder, G.F.,** and Celia, M.A. **(2006)**: *Subsurface Hydrology*, Wiley, Hoboken, New Jersey, 485pp.
10. **Pinet, P.R. (2009)**: *Invitation to Oceanography (5th Ed.)*, Jones and Bartlett Publishers, Sudbury, Massachusetts, 609pp.
11. **Raghunath, H.M. (2006)**: *Hydrology: Principles, analysis and Design (2nd Ed.)*, New age International, New Delhi, 477pp.
12. **Schwartz, F.W.,** and Zhang, H**. (2002)**: *Fundamentals of Ground Water*, Wiley, Hoboken, New Jersey, 592pp.
13. **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.

14. **Sverdrup, K.,** and Armbrus, V. **(2008)**: *Introduction to the World's Oceans (10th Ed.)*, McGraw-Hill, New York, 528pp.

15. **Trujillo, A.P.,** and Thurman, H.V. **(2010)**: *Essentials to Oceanography (10th Ed.)*, Prentice Hall, New Jersey, 576pp.

16. **Viessman, W.,** and Lewis, G.L. **(2002)**: *Introduction to Hydrology (5th Ed.)*, Prentice Hall, New Jersey,612pp.

Semester-III

GCT-308: Fundamentals of Remote Sensing and Digital Image Processing

Unit-1: Introduction & Principles of Remote Sensing (20)

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

Unit-2: Aerial Photography (12)

Aerial photographs: types, scale, & resolution; Types of aerial cameras and photographic films; Geometry of aerial photographs; Parallax, relief displacement, and orthophotos; Elements of visual image interpretation

Unit-3: Satellite Remote Sensing (14)

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

Unit-4: Digital Image Processing (14)

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

REFERENCES

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

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

Journals:

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

Websites:

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

Semester–III

GOT-305: Geography of Environment

Unit-I

Concept of environment: Major elements of environment; Functioning of environmental systems: role of biotic and abiotic elements; Biodiversity: meaning, factors influencing biodiversity. (15)

Unit-II

Ecosystem (geographic classification) terrestrial and aquatic ecosystems - location, types and characteristics; Energy flow in an ecosystem; food chain, food web and Ecological pyramids; succession; Biogeochemical cycles (carbon, nitrogen and oxygen). (15)

Unit-III

Environmental hazards and disasters: earthquakes, tsunami, tropical cyclones, droughts, floods, forest fires: distribution, causes and consequences; Global warming, Disaster management in Maharashtra and India.(15)

Unit-IV

Conservation and management of environment; Concept of sustainable development; environmental pollution (water, Air, Noise) , Land degradation; Environment impact assessment; Environmental issues,policies and efforts in India, International programmes and Policies(Brundtland commission, Kyoto protocol, agenda 21, Sustainable development goals, Paris agreement. (15)

REFERENCES:

1. Abbott, P.L: Natural Disasters, McGraw-Hill, London.
2. Botkin, D.B., Keller, E.A. (2007): Environmental science: Earth as a Living Planet. John Wiley and Sons, New York.
3. Cunningham, W. Cunningham, Mary: Environmental Science: A Global Concern (2010). MacGraw-Hill, London.
4. Government of India (2010): Status of Environment Report. New Delhi.
5. Keller, E.A, Vecchio, D.E.de: Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes. Prentice Hall, New York.
6. Marsh, W.M., Grossa, J. (2005): Environmental Geography: Science, land use, and Earth Systems. John Wiley, New York.
7. McKinney, M.L., Schoch, R.M. (2003): Environmental science: Systems and Solutions. Jones &Bartlett Learning.
8. Miller, G.T, Spoolman, Scott (2011): Environmental Science. Brooks Cloe, London.
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11. http://www.pbs.org/wnet/savageearth/
12. R.B. Singh (1990) Environmental Geography, Heritage Publishers New Delhi,
13. R. B. Singh(Ed) Disaster Management, Rawat Publication, New Delhi,
14. Saxena, H.M (2000) Environmental Geography, Rawat publication, New Delhi
15. H. K. Gupta (2003) (Ed) Disaster Management, University Press, India,
16. Chandna, R. C. (2002): Environmental Geography, Kalyani, Ludhiana
17. Cunninghum, W. P. and Cunninghum, M. A. (2004): Principles of Environmental Science: Inquiry and Applications, Tata McGraw Hill, New Delhi
18. Goudie, A. (2001): The Nature of the Environment, Blackwell, Oxford
19. Miller, G. T. (2004): Environmental Science: Working with the Earth, Thomson Brooks Cole, Singapore
20. MoEF (2006): National Environmental Policy-2006, Ministry of Environment and

Forests, Government of India, New Delhi
21. Singh, S. (1997): Environmental Geography, PrayagPustakBhawan, Allahabad
22. UNEP (2007): Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme

Semester-III

GOT-306: Biogeography

Unit-I

Nature of biogeography, History of biogeography – Development of concepts (Limnaeus, Humboldt, Darwin, Wallace, Wegner, Heming, Brudin, Croizat), Plate tectonic and biotic change, Communities and patterns in biogeography – Biomes, Hotspots, biodiversity, alpha beta diversity and niche. Importance to society (15)

Unit-II

Classifications of animals and plants taxonomical, ecological and geographical, equilibrium theory, neutral theory, species area relationship.latitudinal and altitudinal distribution. (15)

Unit-III

Processes – evolution (life of origin theories, evolution theories), dispersal and vicariance, speciation, extinction, invasion, and colonization. Biological interactions – predations, competition, mutualism, parasitism and mimicry. (15)

Unit-IV

Influencing factors on life- physical, climatic and biological.Island biogeography, marine biogeography, Influence of humans, disturbance factors – physical and biological, changing continents and climates, conservation of biogeography. (15)

REFERENCES:

1. Barry C. (1977): Biogeography – An ecological & evolutionary Approach, Oxford.
2. Cole M.M. (1975): Recent developments in Biogeography, Longman,London.
3. Danserau P. (1957): Biogeography- An Ecological perspective, Renold Press, New York.
4. Darlington P.J. (1957): Zoogeography – Methew, New York.
5. Furley P.A, & Newly W.N.(1983): Geography of the Biosphere : Butter Worth, London.
6. Joy T.V. (1997); Biogeography – study of plants in the ecosphere.
7. Mathur H.S. (1986): Elements of Biogeography, Pointer Jaipur.
8. Martin C. (1975): Plant Geography. Methuen, London.
9. Muller P. (1986): Biogeography; Harper & Row, New York.
10. New big in M.I. (1986): Plant & Animal Geography : Methuen, London.
11. Pears N. (1985): Basic Biogeography, Longman, London.
12. Watts, d. (1971): Principles of Biogeography, McMillan, London.
13. Simmms T. G.: Biogeography, Natural & Cultural, Arnold & Heinemann, London.

Semester-III

GOT-307: Settlement Geography

Unit-1: Fundamentals of Settlement Geography

Settlement geography-meaning, nature, scope and significance; evolution and growth of human settlements; Definition and types of settlements; Site, situation and locational factors. Locational arrangement of settlements: spacing, dispersion and localization.(10)

Unit-2: Geography of Rural Settlements

Introduction to rural settlement geography, Approaches to rural settlement geography; Morphology of rural settlements; Rural-service centers-nature, hierarchy, service area and interaction; Indian villages-evolution and multiplicity, regional characteristics, morphology, transformation of Indian villages, Rural planning and challenges.(15)

Unit-3: Geography of Urban Settlements

Introduction to urban settlement geography, Concept and processes of urbanisation, suburbanization, urban fringe, urban sprawl, Functional classification of urban settlements; Size and spacing of cities- rank-size rule, law of primate city, urban hierarchies; Urban problems, Urban planning and challenges, Concept of smart city, Garden city movement, Urban agriculture. (20)

Unit-4: Theories and Models in Settlement Geography

Concentric zone model, Sector model, Multiplenuclei theory, Central place theory, Theory by mann and white(15)

REFERENCES:

1. Carter, H. (1975): The study of urban geography. Edward Arnold, London.
2. David, P., Hopkinson M. (1983): The Geography of Settlements, Oliver & Boyd; 2nd Revised edition.
3. Deniel, P. (2002): Geography of Settlements. Rawat Publications, Jaipur and New Delhi.
4. Gosh, S. (1998): Introduction to Settlement Geography. Orient Longman.
5. Haggett, Peter (1991): Geography-A Modern Synthesis, Harper & Row, New York.
6. Hornby,WF., Jones M. (1991): An Introduction to Settlement Geography. Cambridge University Press.
7. Johnston, J.H. (1974): Urban Geography, Pergoman Press, Oxford.
8. Johnston, R, .J. (1984): City & Society. Unwin, London.
9. King, L.J., Golledge R.G.(1978): Cities, Space & Behavior, Prentice Hall, Engle wood cliff, New Jersey.
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11. Mayer, H.M., Cohen (1967): Readings in Urban Geography, Central Book Depot. Allahabad.
12. Mosely, M.J. (2005): Rural Development: Principles and Practice. Sage Publication, London.
13. Northamray, M. (1975): Urban Geography, John Willey & Sons, New York.

14. Pacione, M. (2009): Urban Geography-A Global Perspective. 3rd edition. Routledge, London.
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18. Sidhartha, K. and Mukherjee, S. (2000): Cities-Urbanizations & Urban Systems. Kisalaya Pub. Pvt. Ltd., New Delhi.
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22. 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.
23. Singh, R.L. and Singh, Rana P.B., (eds.) (1979): Place of Small Towns in India. National Geographical Society of India, Varanasi,
24. Singh, R.L., Singh, K.N and Singh Rana P.B., (eds.) (1976): Geographic Dimensions of Rural Settlements. National Geographical Society of India, Varanasi.
25. Wood, M. (2005): Rural Geography: Processes, Responses and Experiences of Rural Restructuring. Sage Publication, London.
26. Yeates& Garner (1971): Readings in Urban Geography. The North American City. Harper & Row. New York.

Semester-III

GOT-308: Advanced Cartography and Surveying

Unit-1: Fundamentals of Cartography

Concept and principles of cartography; Scale- definition, types and importance, Concept of datum- vertical and horizontal, Co-ordinate systems- geographical and projected, Map- definition, types and significance, Cartographic methods and techniques for preparation of maps and diagrams, Sources of cartographic data. (15)

Unit-2: Digital Cartography

Introduction to digital cartography, Manual cartography vs Digital cartography, Cartographic data and its sources, Cartographic database, Map design,Digitalmapping-Thematic maps Symbolization and visualization, Digital cartography- hardware and software, Advantages and disadvantages,Applications of digital cartography (15)

Unit-3: Fundamentals of Surveying

Definition, classification and principles of surveying, Character of surveying work-field work and office work, Sources and types of errors, Precision and accuracy, Units of measurements (10)

Unit-4:Surveying Measurements

Linear measurement-types of ranging, Methods-approximate, direct, optical and electronic, Errors and applications, Angular measurement-types of measured angles, Compass, Meridian, Bearings and azimuths, Errors, Corrections and precautions, Vertical measurement-types and methods of leveling, Contouring- definition, characteristics, methods and interpolation (20)

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2. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
3. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. John Wiley and Sons, New York.
4. FraserTaylor,D.R.(ed.)(1983): Graphic Communication and Design in Contemporary Cartography. John Wiley and Sons, New York.
5. Kanetkar, T.P. and Kulkarni, S.V. (1967): Surveying and Levelling, Part II, A.V.G. Prakashan,Poona.
6. Keates,J.S.(1973):Cartographic Design and Production, Longman Group Ltd.
7. Mailing, D.H. (1973): Co-ordinate Systems and Map Projections. George Philip and SonsLtd.
8. Monkhouse, F.J. and Wilkinson, H. R (1962): Maps and Diagrams,Methuen and Company Ltd. and Company Ltd.,London.
9. Nag, P. (ed.) (1984): Census Mapping Survey, Concept Publishing Company, New Delhi.
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12. Misra, R.P. and Ramesh, A. (1999): Fundamentals of Cartography. Concept Publishing Company, NewDelhi.

13. Rhind, B. and Adams, T. (ed.) (1983): Computers in Cartography. British Cartographic Society,London.

14. Rice Oxley, M.K. and Shearer, W.V. (1929): Astronomy for Surveyors.Methuen and Company Ltd. and Company,London.

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16. Shaw, G. and Wheeler, D. (1994): Statistical Techniques in Geographical Analysis. Prentice Hall, Englewood Cliffs, NewJersey.

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Semester-III

GCP-305: Research Methodology in Geography

Unit-I: Introduction to Research Methodology

1.1. Defining research- Methods of research types, significance of geographical research, research ethics
1.2. Problem formulation and identification.
1.3. Review of Literature: Significance and sources of literature review
1.4. Research Design:meaning, stages, characteristicsand significance of research design(30)

Unit-II: Research Hypothesis, Sampling, Nature and Analysis of Geographical Data

2.1. Meaning of Hypothesis, relevance and types of hypothesis
2.2. Sampling: Meaning and importance, types of sampling
2.3.Selection of sample and size of sample
2.4.Nature and type of Geographical data, significance of spatial and temporal data in geographical studies.
2.5. Methods and sources ofgeographical data collection: conventional and modern; limitations of secondary data and need for data generation, collection of primary data: questionnaires and schedules, field work, sample surveys and their significance
2.6. Geographic Data analysis: Qualitative, Quantitative and Advancedtechniques of geographic data processing and analysis. (35)

Unit-III:Scientific Report Writing

4.1. Introduction- aim and objectives, data and methodology
4.2. Data analysis, result, conclusion
4.3. Referencing system, weblography and bibliography.
4.4. Plagiarism, concept of impact factor, citation. (25)

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Semester-III

GCP-306: Photogrammetry, Remote Sensing and Digital Image Processing

Practicals in Photogrammetry

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

Practicals in Satellite Remote Sensing

1. Study of satellite image browsing system
2. Visual interpretation of satellite images (True Color, FCC, Thermal and Microwave)

Practicals in DIP:

1. Introduction to DIP software
2. Loading of image data, study of histogram and layer information
3. Layer stacking and Interpretation of FCC image
4. Supervised Classification
5. Unsupervised classification
6. Accuracy assessment.

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Semester-IV

GCT-409: Development of Modern Geographical Thought

Unit-1: Field of Geography

Field of geography; its place in classification of science; Geography as a social and natural science; Concepts in philosophy of geography, Areal differentiation and Spatial organization.(10)

Unit-2: Historical Development

General nature of geographic knowledge in the world during the ancient and medieval period; Founders of modern geography with special reference to: i) Alexander Von Humboldt, ii) Carl Ritter, iii) Friedrich Ratzel iv) Vidal de la Blache, v) Ellen Churchill Sample, vi) William Morris Davis vii) Varenius viii) Richard Hartshorne.Geography in the 20^{th} Century, conceptual and methodological development and changing paradigms.Development of geography as a discipline in India.(20)

Unit-3: Dualism in Geography

Dualism in geography: systematic and regional; physical and human; idiographic and nomothetic; concept of determinism and possibilism.(10)

Unit-4 Scientific Explanations and Approaches

Scientific explanations: routes to scientific explanations (inductive / deductive); Types of explanations (cognitive description, cause and effect, temporal); theories, laws and models; quantitative revolution; Approaches: positivism, humanism, radicalism, behaviouralism and post modernism; Recent trends in Geography.(20)

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Semester-IV

GCT-410: Regional Planning and Development

Unit-1:

Region-Concept, types and hierarchy of regions - planning- concept and types. Planning region-concept and characteristics of a planning region, Delineation of planning region, Indicators for measuring development, Development- meaning, growth versus development, Measurement of regional development. (15)

Unit-2:

Theories and models for regional development: spread and backwash concept. Core and periphery concept, Central place theory, Growth pole, Growth foci approach, Economic growth stage model (Rostow). (15)

Unit-3:

Policies and experiences of regional planning in India, Institutional framework from national planning level to regional development plans, Special economic zone, Damodar valley corporation (India), Tennessee valley authority (USA). (15)

Unit-4:

Regional planning in India- rural and urban planning.Regional disparities in India, Planning for tribal area, Hilly area, Command area, and Drought-prone area development.(15)

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Semester-IV

GOT-409: Fundamentals of Geographical Information System and Introduction to GPS

Unit 1: Introduction to GIS (20)

Definition of GIS, History and development of GIS, Components and Future of GIS, Types of Geographic data; Raster and Vector data model: Advantages and Disadvantages; Spatial data input: Digitization and Conversion; Point, line and polygon; Concept of Arc, node and vertices; Digitization errors; Topology and topological relationship

Unit 2: GIS Analysis (12)

Spatial analysis: Overlay and Buffer Analysis, Interpolation techniques in GIS; Terrain analysis: DEM, DTM and TIN; Non-spatial data: Data quality Issues, Database Management system (DBMS)

Unit 3: Introduction to GPS (12)

Introduction to GPS; types of GPS; Space, Control and User Segment; GPS satellite; Working principle of GPS; Source of GPS errors;Differential GPS; GNSS & GIS Integration, Applications of GPS.

Unit 4: Applications of Geospatial Technology (16)

Geospatial Technology in Urban and Regional planning, Water resource management,Soil resource Management, Agricultural Management, Forestry and Environment, Land use/ and Land cover mapping, Landform analysis and Natural hazards assessment .

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Semester-IV

GOT-410: FUNDAMENTALSOF SOIL GEOGRAPHY

Unit-1:

Introduction to soil geography: Concepts and definitions, origin, soil profile and categories of soil taxonomy. Soil forming processes and factors, Weathering and soils, Soil as a medium for plant growth, Essential nutrient elements, Plant roots and soil relations. Soil fertility and soil productivity.(15)

Unit-2:

Physical properties of soil: Soil texture, Soil structure;Genesis and Types of structure, Soil consistence, Soil:- moisture, colour, porosity and permeability.Effects of tillage on structure and porosity.(15)

Unit-3:

Chemical properties of soil: chemical composition of soils, Ion exchange, Cation exchange, Determination of soil pH, Management of soil pH, Soil clays, humus, organic matter, and NPK. (15)

Unit-4:

Soil and environmental problems: Classification of tropical soils, Soil erosion, Universal soil loss equation (USLE), Nature and management of saline and sodic soils. Soil Contamination, Micronutrients and Toxic Elements in soils : Iron and manganese, Copper and zinc. Conservation of soil, Methods of Soil reclamation. (15)

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Semester-IV

GOT-411: Tourism Geography

Unit-1:

Concept of tourism, components of tourism, significance of tourism, history of tourism, growth and development of tourism, Natural, Economic and Social significance and impacts of tourism - Tourism as a foreign exchange earner.(15)

Unit-2:

Resources for tourism industry – natural, man-made, cultural, historical, types of transportation, types of accommodation, types of tourism.New trends in tourism.Globalization and tourism.(15)

Unit-3:

Marketing in tourism – concept of marketing, product, marketing mix, segmentation, Promotion.Tour and travel agency management.Ticketing, passport, visa, other formalities, Itinerary Planning.(15)

Unit-4:

Planning in tourism management, Tourism planning and development: Planning for tourism - Coordination in planning - assessment of tourist demand and supply - basic infrastructure planning for finance, human resources & environment maintance of tourist centres - time factor - regional planning consideration - tourism promotional planning - advertisement, media, public relations & publicity.Tourism Policy Issues; strategic tourism planning; planning for tourism growth in India. (15)

REFERENCES:

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Semester-IV

GOT-412: Agricultural Geography

Unit-1:

Definition, nature and scope of agricultural geography; Origin and dispersion of agriculture; Approaches to the study of agricultural geography.(15)

Unit-2:

Determinants of agricultural patterns-physical, economic and technological; Agricultural systems of the world - location, distribution, types & characteristics of agriculture.(15)

Unit-3:

Concept & techniques of delimitation of agricultural regions- Crop combination, Crop diversification; Measurement and determinants of agricultural Productivity, Agricultural land use theory- Von Thunen's model of Land Use planning; spatial diffusion Process.(15)

Unit-4:

Agricultural Revolution in India (Green, White) Nature, Socio-economic constraints in the adoption, performance, Problems & prospects. Land use survey, Land classification and land capability, Dry land Agriculture, Food Security, Organic farming, Agricultural Policies in India. (15)

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Semester-IV

GOP-409: Introduction to GIS software and GPS

1. Introduction to QGIS: (15)

1. Introduction of QGIS.
2. Projection and Reprojection.
3. Georeferensing: Toposheet

2. **Basics of QGIS:(15)**

1. Image Registration.
2. Digitization of Toposheet.
3. Map preparation or Map Layout.
4. Working with Google Earth.

3. **Data Exploration: (15)**

1. Data query: Spatial
2. Data query: Attribute.
3. Data exploration & working with tables.

4. Introduction to GPS instrument: (15)

1. GPS instrument
2. Basic functions
3. GPS surveying: Setting of GPS coordinates, Waypoints demarcation, Area Calculation through GPS, Navigation by Mobile GPS application.
4. Transfer of data in GIS software

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4. http://downloads.esri.com/support/documentation/ao_/698What_is_ArcGis.p

5. https://academy.autodesk.com/explore-and-learn

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Semester-IV

GOP-402: SOIL AND WATER ANALYSIS

Unit-1:

Soil survey: Field sample collection and preparation; Site selection and geomorphic considerations; Equipment and reagents; Field assessment: saline soils, sodic soils and high pH soils. Laboratory sample collection and preparation: Field-Moist preparation and Air-Dry preparation. (15)

Unit-2:

Physical analyses of soil: Soil morphology- Soil colour, Structure and Consistence. Particle-size distribution analysis: Determinesoil textural classes using sieves and shakers. (15)

Unit-3:

Chemical extractions and analyses of soils: Determination of soil pH, Measurement of electrical conductivity (EC), Determination of organic matter and Calcium carbonate, Determination of sodium, calcium and magnesium. (15)

Unit-4:

Water sample analysis: Determination of pH; Determination of electrical conductivity; Determination carbonates and bicarbonates; Determination of salinity, Determination of turbidity. (15)

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Semester-IV

GCP-407: Dissertation/ Project (Based on field work)

Students are 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.

REFERENCES:

1. Archer J.E. &dalton T.H. (1968): The fields work in Geography, E.t. BatsfordLtd.,London.
2. Haring, Lloyed (1975): Scientific Geographic Research WC.Brow Company USA.
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Scheme of Evaluation: (out of 100)

a) Written test: 40 Marks
b) Presentation and Evaluation of Project Report/Dissertation: 40 Marks
c) Viva-Voce- 20 Marks

GCP-408: Study Tour Report Writing

Students are required to submit study tour report based on field observations during the study tour.

REFERENCES:

1. Archer J.E. & Dalton, T.H. (1968): The fields work in Geography, E.t. BatsfordLtd.,London.
2. Haring, Lloyed (1975): Scientific Geographic Research WC.Brow Company USA.
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***Scheme of Evaluation: (out of 20)**

i) Evaluation of Study Tour Report: 20 Marks