

**PUNYASHLOK AHILYADEVI HOLKAR
SOLAPUR UNIVERSITY, SOLAPUR**



NAAC Accredited- 2022
'B⁺⁺' Grade (CGPA2.96)

Name of the Faculty: Science & Technology

New Education Policy-2020

Syllabus: Geography

Name of the Course: M.A./M.Sc. II (Sem.–III&IV)

(Syllabus to be implemented from w.e.f. June 2024)

M.A./ M.Sc.II-Geography w.e.f.2024

Semester-III									
Sem.-III	Code	Title of the Paper	Semester Exam.			L	T	P	Credits
		Hard Core	UA	IA	Total				
Geog.	DSC-5	Agricultural Geography	60	40	100	4	--	--	4
	DSC-6	Settlement Geography	60	40	100	4	--	--	4
Soft Core (Anyone)									
	DSE-3	3.1 Biogeography	60	40	100	4	--	--	4
	DSE-3	3.2 Commercial Geography	60	40	100	4	--	--	
Open Elective (R.P.1)									
	R.P.	Research Project in Geography-I	60	40	100	4	--	--	4
Practical									
	DSC-5 (P)	Quantitative Techniques in Economics Geography	30	20	50	--	--	2	2
	DSC-6 (P)	Quantitative Techniques in Population & Settlement Geography	30	20	50	--	--	2	2
Soft Core(Anyone)									
	DSE-3.1 (P)	Introduction to Remote Sensing	30	20	50	--	--	2	2
	DSE-3.2 (P)	Introduction to Computer	30	20	50	--	--	2	
	Total for Third Semester		330	220	550				22
Semester-IV									
	Code	Title of the Paper	Semester Exam			L	T	P	Credits
Geog		Hard Core	UA	IA	Total				
	DSC-7	Regional Planning and Development in India	60	40	100	4	--	-	4
	DSC-8	Development of Modern Geography	60	40	100	4	--	-	4
Soft Core(Anyone)									
	DSE-4	4.1 Political Geography	60	40	100	4	--	-	4
	DSE-4	4.2 Geography of Tourism	60	40	100	4	--	-	
Open Elective (R.P.2)									
	R.P.	Research Project in Geography-II	60	40	100	4	--	--	4
Practical									
	DSC-7 (P)	Introduction to GIS and GPS	30	20	50	--	--	2	2
	DSC-8 (P)	Computer Application in Geography	30	20	50	--	--	2	2
Soft Core (Anyone)									
	DSE-4.1 (P)	Application of Remote Sensing	30	20	50	--	--	2	2
	DSE-4.2 (P)	Map Projection and Cartography	30	20	50	--	--	2	
	Total for Forth Semester		330	220	550				22

L=Lecture,T=Tutorials,P=Practical,IA=InternalAssessment,4CreditsofTheory=4 Hour soft eaching per week, 2 credits of Practical = 4 Hours per week, HCT= Hard core theory, SCT= Soft core theory, HCP= Hard corePractical,SCP=SoftcorePractical,OET=Openelectivetheory,OEP=OpenelectivePractical,MP=Major Project

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Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper- Agricultural Geography

Paper Code- DSC-5

Total Lectures– 60

Course Credit– 04

Total Marks-100

Objective:-

1. To familiarize the students with concept origin and development of agriculture.
2. To examine the role of agricultural determinants.
3. To make familiarize the students with the application of various theories, models, Agricultural system, and productivity.
4. To reexamine green revolution in India, contemporary issues and agricultural problems in Solapur district.

Learning Outcome:-

1. The course will provide an understanding of the conceptual and dynamic aspects of Agriculture.
2. Students became aware of types of agriculture and regions in the world.
3. Student will identify the basic concept of crop combination and crop diversification.

Unit No.	Descriptions	No. of Lectures
I	Agricultural Geography: 1.1 Definition, Nature and Scope of Agricultural Geography 1.2 Origin and Evaluation of Agriculture 1.3 Approaches to the study of Agricultural Geography: 1) Systematic 2) Regional	15
II	Determinants and Types of Agriculture: 2.1 Physical, economic and technological Determinants, 2.2 World Agricultural systems: Location, distribution, types and characteristics of a) Shifting Cultivation, b) Intensive Agriculture, c) Extensive Agriculture, e) Plantation agriculture, f) Mixed Agriculture g) Dairy Farming, and h) Primitive Farming.	15
III	Concepts and techniques of delimitation of agricultural regions: 3.1 Crop combination, Crop diversification, 3.2 Measurements of agricultural Productivity,	15

	3.3 Agricultural land use Model- a) Von Thunen's Model, and b) Jonasson's Model	
IV	Green Revolution in India: 4.1 Nature and impact of Socio-Economic, 4.2 Problems and prospects in the adoption of Green Revolution, 4.3 Ecological implications of the green revolution, 4.4 Organic Farming, Agro clinic 4.5 Contemporary issues: Food, Nutrition and Hunger, 4.6 Agricultural policies in India.	15

References:-

Sr. No.	Name of Books	Name of Authors
1	Geography of Agriculture; Thems in Research. Prentice-Hall Englewood cliff. London.	Gregor H. F. (1970)
2	Agricultural Geography. Oxford University Press, London	Ilbury B.W. (1983)
3	Agriculture and Environment Change John Wiely, London.	Mannlon A. M. (1995)
4	Studies in Agricultural Geography/Rajesh Publication New Delhi	Mohammed Ali. (1978)
5	Agricultural Geography, New Delhi	Singh Jasbir&Dhillon S. S.
6	Agricultural Geography, Newton Abbot	Tarrant J. R. (1974)
7	Poverty Agriculture & Economic Growth, Vikas Publication New Delhi	Bhatia B. M. (1977)
8	The agricultural Systems of the World, Cambridge University Press	Grigg D. B. (1973)
9	Systematic Agricultural Geography, Rawat Publication Jaipur (India)	HussainMajid (1999)
10	Agricultural Geography, London	Symon. (1968)
11	Perspective in Agricultural Geography, Six Volume	Noor Mohammed
12	Green-Revolution How is it? Vishal Publication Kurukshetra.	Jasbir Singh (1973)

Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper- Settlement Geography

Paper Code- DSC-6

Total Lectures– 60

Course Credit– 04

Total Marks-100

Objective:-

1. To familiarize the students with the conceptual, theoretical and empirical development in settlement studies in Geography.
2. To provide an idea to the students about the national issues of settlements.
3. To introduce functional classifications of towns in urban and rural area.

Learning outcome:-

- 1 Student will explain fundamentals and development of Settlement geography
- 2 Student will interpret determinants, types, pattern and growth of rural settlement.
1. Student will underline functional classification and morphological structure of urban centers.
2. Student will examine Concepts, issues, policies and theories of Settlement geography.

Unit No.	Title of the Unit	No. of Lecture	No. of Credits
1	1.1 Settlement Geography: -Definitions, Nature and Scope. 1.2 Significance and evolution of Human Settlement 1.3 Trend and growth of Human Settlement.	15	1
2	2.1 Rural Settlement: Site and situation, types & pattern, size and growth of Rural settlement, 2.2 Functional Classification of Rural settlement, House types based on building material, 2.3 Environmental, socio-economic, & Cultural Factors influencing the dynamics structure of Rural Settlement.	15	1
3	3.1 Urban Settlement: Meaning, nature and scope of Urban Geography, 3.2 Functional classification of Urban centers, Morphological structure of cities 3.3 The Concentric Zone Theory, The Sector Theory, The multi nuclei Theory	15	1
4	4.1 Theories of Christaller and August Losch and their applications. 4.2 Measurement of centrality and hierarchy, Concept of Primate city, City region and Rank-size rule. 4.3 Issues, perspective and policies on population & human Settlement. 4.4 Sustainable development of rural settlement	15	1

Reference Books

- 1 Ambrose, Peter, Concepts in Geography Vol.-I Settlement Pattern, Longman 197.
- 2 Census of India, House types and Settlement Patterns of Villages in India, GOI, New Delhi 1961.
- 3 Singh R. L. and KashiNath Singh (Editors); Readings in Rural Settlements Geography, National Geographical Society of India. Varanasi, 1975.
- 4 Ucko, M.J., Ruth Tringham and G.W. Dimbleby (editors), Man, Settlement and Urbanism, Duckworth 1972.
- 5 United Nations Centre for Human Settlements (HABITAT), An Urbanising World, Global Report on Human Settlements, Oxford University Press for HABITAT 1996.
- 6 Hudson, F. S. (1977) Geography of Settlement Mcdonadls and Evaus New York
- 7 Singh R. V. Geography of settlement, Rawat Pub. Jaipur
- 8 Mandel R B (1979): Introduction to Rural settlement

Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper:-Biogeography

Paper Code- DSE-3.1

Course Credit– 04

Total Lectures– 60

Total Marks-100

Objective:-

- 1) To introduce the student the concept of Biogeography and its interpretation.
- 2) To introduce the students with physical environment and their interactions with the living organisms.
- 3) To introduce the students with the living and non-living environments and their interactions.
- 4) To make awareness about conservation of biodiversity and biotic resources.

Learning outcome:-

1. The course will provide an understanding of Ecosystem.
2. Students will also learn the significant and development of biogeography.
3. Students became aware of functions of ecosystem.
4. Student will identify the basic concept of biogeographic region and biomes.

Unit No.	Sub Unit	No. of Lectures	credits
I	Biogeography:- 1.1 Introduction, Definition, Nature and Scope of Biogeography 1.2 Significance and Development of Biogeography 1.3 Approaches of Biogeography 1.4 Branches of Biogeography	15	1
II	Ecosystems :- 2.1 Ecosystem: Concept and Meaning, Elements and types, Habitat, Plant and Animal association 2.2 Functions of Ecosystem: Food Chain, Food Web, Energy 2.3 Pyramid with examples 2.4 Concept of Biogeographic Region and Biomes; Major Biomes in the World- Tropical, Temperate, Tundra and Taiga Forest, Grassland, Desert and Mountain	15	1
7 Page			

III	Introduction to Plant and Zoo Geography: A. Plant Geography: 3.1 Factors Influencing on Plants 3.2 World Distribution of Forests 3.3 Plant-evolution, adoption, speciation, extinction, colonization and dispersal importance of Plants B. Zoo Geography: 3.4 Relationship of Zoo geography with the environment. 3.5 Migration and dispersal of animals (Wild Attack on human Settlement) 3.6 Causes of migration and their effects	15	1
	A. Paleo records: 4.1 Paleo records of plants and animals 4.2 Paleo records of climatic changes 4.3 Paleo records of environmental changes in India B. Conservation of Biotic Resources: 4.4 National Forest Policy of India. 4.5 Conversation of Biotic Resources. 4.6 Legal Protection to Plants and Animals	15	1

Reference Books

Sr.No.	Name of Books	Name of Authors
1	Man & Environment in India through ages, Books & Books	Agarwal D. P. 1972
2	Earth an living planet, ELBS, London.	Bradshaw M. J. 1979
3	Biogeography an ecological and evolutionary approach	Cox C.D. & Moore P.D. 1993
4	Environment and Ecology of early man in northern India, R.B. Publication Corp.	Gaur R.1987
5	Fundamentals of Biogeography Rout ledge, USA	Huggett R. J. 1998
6	Indian geosphere – biosphere, Her Anand Publication Delhi	Khoshoo T.N. & Sharma M. (edi) 1991
7	Encyclopedia of Environmental Science. Megrew Hill.	Lapedes D. N. (edi) 1974
8	Basic Biogeography 2 nd edition Longman, London	Pears N. 1985
9	Biogeography, English Language Book Society, London.	Robinson H. 1982
10	Biogeography: - Natural & Cultural Longman, London	Simmon I. G. 1994
11	Biogeography: - A study of plants & ecosphere. 3 rd edition. Oliver & Boyd, USA.	Tivyj. 1992

Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper- Commercial Geography

Paper Code- DSE-3.2

Total Lectures– 60

Course Credit– 04

Total Marks-100

Objectives:

1. To understand the basic concept of commercial Geography.
2. To make the student of commerce aware about the relationship between the geographical factors and economic activities.
3. To acquaint the student about dynamic aspect of commercial Geography.
4. To provide the information about concept of population and tourism..

Learning Outcomes : The students will be able to

1. Student will describe basic concept of Commercial Geography.
2. Student will illustrate the Correlation between Geographical environment and Commerce.
3. Student will explain the roll of trade, transport and industries in commercial Geography.
4. Student will explain an importance of Population dimensions and tourism industries in Commercial Geography.

Unit No.	Title of the Unit	No. of Lecture	No. of Credits
1	Introduction to Commercial Geography 1.1 Definition, Nature and Scope of Commercial Geography 1.2 Approaches to the study of Commercial Geography 1.3 Importance of Commercial Geography	15	1
2	Geographical environment and Commerce 2.1 Physical and Cultural Environment 2.2 Classification of economic activities 2.3 Contribution of economic activities in national development	15	1
3	Trade, Transport and Industries 3.1 Geographical factors affecting on international trade 3.2 India's foreign trade 3.3 Major International routes - Rail, Sea & Air 3.4 Importance of transportation in commercial development 3.5 Major industries in India-Iron & Steel, Cotton and Textile	15	1

	Automobile, IT Industries		
4	Population and Tourism 4.1 Concept of optimum population, over population and under population 4.2 Geographical factor influencing tourism 4.3 Tourism industry and Agro-tourism in India.	15	1

References:

1. Alexander J.W. (1976):Economic Geography, Prenticehall of India, New Delhi.
2. Robinson H &Bamford C.G. (1978): Geography of Transport, Macdonald &Evans USA.
3. Commercial Geography – Sir Dudley Stamp
4. Economic and Commercial Geography – Gupta
5. Watts H.D.(1987) : Industrial Geography, Longman Scientific & Technical New York

Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper- Research Project in Geography-I

Paper Code- RP-1

Total Lectures– 60

Course Credit– 04

Total Marks-100

Objectives:

1. To understand the process of geographic research.
2. To develop the skills in formulating research questions and hypotheses.
3. To design and implement data collection methods and analyze, interpret geographical data.
4. To present research findings effectively in written and oral formats.

Learning outcomes: At the end of the course students will be able to:

1. Student will able to understand the process of geographic research.
2. Student can able to achieve the skills in formulating research questions and hypotheses.
3. Student able to understand data collection, analyze and how to interpret the data.
4. Student get a knowledge how to research findings effectively present in written and oral formats.

Unit No.	Descriptions	No. of Lectures	No of Credits
Section-I			
I	Introduction to Geographical Research: 1.1 Identification and finalization of research problem / subject 1.2 Review of Literature and Significance of research 1.3 Research Design-Data collection and Data Analysis 1.4 Data Interpretation and effective findings	15	01
II	Writing the Research Proposal : 2.1 Structure of Research Proposal 2.2 Plan of research project 2.3 Research Writing 2.4 Research work presentation	15	01
Section-II			
I	The students individually or a batches of not exceeding 15 are required to select a problem for the project report. They are expected to make synopsis related to the problem	30	02

Reference Books:

1. Ahuja Ram, – Research Method
2. Archet J. E. Dalton T. H. (1968): The fieldwork in geography, Batsford Ltd., London.
3. Borase: An Introduction of Research Method, (2005)
4. Dr. Mundkur, Suman. Develop an Effective Research Proposal. Notion Press, 2023.
5. Hamid, Mohamed. How to Write a Research Proposal and Thesis. C I Publications, 2023.
6. HamingLiored (1975): Scientific Geographic Research, W C Brow Company U.S.A.
7. Hans Raj (1988): Theory and Practice in Social Research, Surjeet Publication, 7-K, Kolhapur

8. John H. B., Dr. Mini Agrawal. Basics of Research Methodology. Redshine Publication, 2023.
9. Johnes P. A.: Field work in Geography, – Longman
10. Kothari C. R. (1996): Research Methodology, – VishwasPrakashan, New Delhi
11. Misra R. P. (1991): Research Methodology in Geography, Concept publication New Delhi
12. Walliman, Nicholas. Your Research Project. Sage South Asia, 2011.

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Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper (Practical Paper):

Quantitative Techniques in Economic Geography

Paper Code-DEC-5 (P)

Total Lectures– 60

Course Credit– 02

Total Marks-50

Objectives:

1. To understand the students to the quantitative techniques in geography.
2. To introduce some basic techniques to applied in various themes in geography.

Learning Outcomes :

1. The course will provide an understanding difference between crop combination and crop diversification with typical Measurement.
2. Students will be examined cropping pattern with agricultural productivity in specific area.
3. Student will identify transport network and connectivity of urban field.
4. Students will also attain the skill of different graphical and choropleth mapping techniques and representation.

Unit No.	Title of the Unit	No. of Lecture	No. of Credits
1	Quantitative Techniques in Agriculture Geography. 1.1 Measurement of agricultural productivity- Kendall, Sapre and Deshpande 1.2 Crop Combination- Weaver and Doi. 1.3 Crop Concentration and Diversification-Bhatia	30	1
2	Quantitative Techniques in Marketing Geography 2.1 Basic Gravity Model. 2.2 Law of Retail Gravitation 2.3 Breaking Point Theory 2.4 Accessibility of Transport network	30	1

Reference Books:

1. Chandana and siddhu – Population Geography
2. Clarke. J. I. – Population Geography, Pergamoh Press, London.
3. Cole and king-Quantitative Geography.
4. Elhance D. N – Fundamentals of Statistics, KitabMahal, Allahbad.
5. Gregory, S. Statistical Methods and the Geographers. Longman Group Ltd.
6. Hammond. R and McCullogh,-Quantitative Techniques in Geography: an introduction,

Clarendon Press, Oxford.

7. Mahmood Aslam Statistical Methods in Geography.
8. Saxena. H. M. Geography of Marketing; Concepts and methods, New Delhi
9. Singh Jasbir-An Agricultural Geography, Vishal Publication, Kurukshetra.
10. Woodcock R. G. & Bailey M. J. – Quantitative Geography, Mac Donald & Erans Ltd. London.

Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper (Practical Paper):

Quantitative Techniques in Population and Settlement Geography

Paper Code-DSC-6 (P)

Total Lectures– 60

Course Credit– 02

Total Marks-50

Objectives:

1. To understand the students to the quantitative techniques in geography.
2. To introduce some basic techniques to applied in various themes in geography.
3. To familiarize the students various techniques of projected population with mapping view.
4. To get the students identify and drawing the Lorenz curve, birth date distribution diagram and its variable relationship.

Learning Outcomes:

1. The course will provide an understanding difference between crop combination and crop diversification with typical Measurement.
2. Student will identify transport network and connectivity of urban field.
3. Student will indicate different information of rank size rules and functional classifications of towns with examples.

Unit No.	Title of the Unit	No. of Lecture	No. of Credits
1	Quantitative Techniques in Population Geography 1.1 Measurement of birth rates, age-specific, crude and death rates 1.2 Population projection - Semi Average method and Least Square method. 1.3 Lorenz Curve.	30	1
2	Quantitative Techniques in Settlement Geography 2.1 Nelson's method of functional classification of towns. 2.2 Nearest Neighbor Analysis. 2.3 Ranks-Size Rule	30	1

Reference Books:

1. Chandana and siddhu – Population Geography
2. Clarke. J. I. – Population Geography, Pergamoh Press, London.
3. Cole and king-Quantitative Geography.
4. Elhance D. N – Fundamentals of Statistics, KitabMahal, Allahbad.
5. Gregory, S. Statistical Methods and the Geographers. Longman Group Ltd.
6. Hammond. R and McCullogh,-Quantitative Techniques in Geography: an introduction,

Clarendon Press, Oxford.

7. Mahmood Aslam Statistical Methods in Geography.
8. Saxena. H. M. Geography of Marketing; Concepts and methods, New Delhi
9. Singh Jasbir-An Agricultural Geography, Vishal Publication, Kurukshetra.
10. Woodcock R. G. & Bailey M. J. – Quantitative Geography, Mac Donald & Erans Ltd. London.

Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper (Practical Paper):

Introduction to Remote Sensing (3.1)

Paper Code-DSE-3 (P)

Total Lectures– 60

Course Credit– 02

Total Marks-50

Objectives:

- 1.To study the definition, process and elements of Remote Sensing.
- 2.To familiar student about application, Advantages and limitations of Remote Sensing.
- 3.To study the types of remote sensing data and methods of data analysis.
- 4.To learn Physical and Cultural elements of the interpretation of Remote Sensing data.

Learning Outcomes: The students will be able to

- 1.The course will make student to able to understand about fundamentals of remote sensing.
2. Students get the knowledge about advantages and application of remote sending in geography.
- 3.Student will understand about remote sensing data and methods of data analysis.
- 4.Student will able to understand about the elements and interpretation of remote sensing data.

Unit No.	Descriptions	No. of Lectures	No. of Lectures
I	Introduction to RS 1.1 Definition, Concept & History of Remote Sensing 1.2 Process of Remote sensing 1.3 Elements of Remote Sensing a) Solar energy b) Sensor c) Platform 1.4 Types of Remote Sensing 1.5 Advantages and limitations of Remote Sensing 1.6 Application of Remote Sensing	30	01
II	Introduction, Interpretation and Mapping of Aerial Photographs 2.1 Indexing of aerial photographs 2.2 Tracing with naked eyes 2.3 Advantages of aerial photography 2.4 Types and characteristics of aerial photographs 2.5 Elements of aerial photo interpretation: 2.6 Mapping of Land use and land cover, Relief and landforms, Drainage Pattern, Cultural landscape and Rock types	30	01

Reference:

- 1.Barrett E.C. and L.F. Curtis (1992): Fundamentals of remote sensing and air photo interpretation – Mcmillon, New York
- 2.BasudebBhatta (2016): Remote Sensing and GIS, Oxford University Press, New Delhi
- 3.Curran Paul. J. (1985): Introduction of remotes sensing, londman, London.
- 4.Comphell J. (1989): Introduction to remote sensing, Fuildord, New York.
- 5.Kang-Tsung Chang (2017): Introduction to Geographic Information Systems, McGraw Hill Education (India) Private Ltd. Chennai

- 6.Lillesand I. M. and Kiefer R. W. (1979): Remote sensing and image interpretation, JohnWiley& Sons New York
- 7.Leuder D.R. (1959): Areal Photographic interpretation, Mc grew Hill BookCompany, New York.
- 8.Sini R. R. Kalwar S. C. (1991): Remote sensing in geography, pointer Publishers, Jaipur.
9. Sabins F. F. Jour (1987): Remote sensing principal of interpretation, (II edition) W.H.Freeman and Company, New York.
10. Ian, Haywood & others (2006): Geographical Information System, pearsonEducation,Inc., Delhi.
- 11.Jamwal, Anil K. (2008): Geographical Information System, JnanadaPrakashan, New Delhi.

Structure of Syllabus (NEP-2020)

M.A./M.Sc. Part- II Semester – III

Name of the Paper (Practical Paper): Introduction to Computer (3.2)

Paper Code-DSE-3 (P)

Total Lectures– 60

Course Credit– 02

Total Marks-50

Objectives:

1. To understand the terms, concepts, involved in computer.
2. To familiarize the student with Internet, Browser and Web page
3. To familiarizes with geographical data and data structure.

Learning Outcomes: The students will be able to

1. The course will provide an understanding the graph, diagram and Structure of Computer.
2. Students became aware of evolution and generations of computer.
3. Student will identify the various geographical websites.

Unit No.	Descriptions	No. of Lectures	No of Credits
I	Introduction to Computer 1.1 Computer-Definition, Evolution, Generations, Types, Characteristics, Input and Output Devices 1.2 Operating System, DOS, Windows, Excel, Software and Number System 1.3 Application of Computer in Geography	15	01
II	Computer and Network 2.1 Internet, IT in Geographical Studies, Web page, Browsing and surfing the geographical sites and Downloading files	15	01

Reference Books:

1. Cole and King (1968)- Quantitative Geography
2. D. J. Unwin& J. A.Dawson (1987)-Computer Programming for Geographer, Longman London
3. David J. Magthre (1989)- Computer in Geography, Longman Scientific and Technical, London.
4. Himmond B. (1974)- Quantitative Technique in Geography, Clarendon press – Oxford
5. Paul M. Mather (1993)-Computer Application in Geography, Jahn Wiley & Sons, New York, U. S. A.
6. RustanShorff- Computer System and Application
7. Sinha&Sinha (2005)- Computer System a Application, BPB publication, New Delhi

**PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY,
SOLAPUR**



NAAC Re Accredited-2022 “B” Grade (CGPA 2.96)

Name of the Faculty: Science and Technology

NEP STRUCTURE 2020

Syllabus: Geography

Name of the Course: M.A./M.Sc. II (Semester IV)

(Syllabus to be implemented from June 2024)

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Structure of Syllabus (NEP 2020)

M.A./M.Sc.Part II Semester IV

Name of the Paper: Regional Planning and Development in India

Paper Code: DSC-7

Total Lectures: 60

Course Credits: 04

Total Marks: 100

Objectives: -

- 1) To understand and evaluate the concept of region in geography.
- 2) To understand the role and relevance of region in regional planning.
- 3) To identify the causes of regional differences in development, perspectives and policy imperatives.
- 4) To understand the problems of regional development.

Learning Outcomes: -

1. The course will provide an understanding of regional planning's of India.
2. Students will also learn the various type of multi-level planning's and hierarchy.
3. Students will be achieving the knowledge of central place theory and growth pole theory

Contents of the Course

Unit No.	Title of the Unit	No. of Lectures	No. of Credits
1	Concept, Classification and Hierarchy of Region 1.1 Region- Concept of Region, Characteristics, Types of Region-Formal or Natural and Functional, 1.2 Classification of Region-Based on Physical, Cultural and Physical-Cultural Variation, 1.3 Hierarchy of Region. Planning-Concept, Types, Regional planning- Concept and Approaches.	15	1
2	Growth and Development 2.1 Concept of Growth and Development 2.2 Indicators of Development, Measurement of Regional Development, 2.3 Regional imbalances in India-Agricultural and Industrial.	15	1

3	Theoretical Framework and Theories 3.1 Theoretical Framework for Regional Planning –Spread and Backwash Concept, 3.2 Central Place Theory 3.3 Growth Pole Theory and Growth Foci Approach.	15	1
4	Regional Planning and Development 4.1 Concept of Multi-level Planning, 4.2 Role of Panchayat Raj System in Regional Development (Village, Tahsil and District), 4.3 Regional Development in India and Maharashtra-Problems and Prospects, 4.4 Regional Development in Macro, Meso and Micro level- Problems and Prospects.	15	1

Reference Books:

- 1 Bhat L.S.(1973): Regional Planning in India, Statistical Publishing Society, Calcutta
 1. Chand M. &Puri V.(1985): Regional Planning in India Allied Publishers Ltd., New Delhi.
 2. Gosal, G.S. and Krishan, G: Regional Disparities in Levels of Socio-economic Development in Punjab, Vishal Publication, Kurukshetra, 1984.
 3. Government of India, Planning Commission: Third Five Year Plan, Chapter on Regional Imbalances in Development, New Delhi 1961.
 4. Kolinsky, A.R. (ed.) Growth Poles and Growth Centers in Regional Planning Mouton, The Hague, 1972
 5. Misra, R. P. and Other (editors) Regional Development Planning in India – A Strategy. Institute of Development Studies Mysore, 1974.
 6. Myrdal, G: Economic Theory and Under Development Regions Gerald Dockworth, London, 1957.
 7. Regional Planning concepts Techniques, Polies and case studies concept publishing crop New Delhi 1992
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Structure of Syllabus (NEP 2020)

M.A./M.Sc. Part II Semester IV

Name of the Paper: Development of Modern Geography

Paper Code: DSC-8

Total Lectures: 60

Course Credits: 04

Total Marks: 100

Objectives :

1. To introduce the students to the philosophical and methodological foundations of the subject and its place in the world of knowledge.
2. To familiarize student with the major land marks in development of geographic thought at different periods of time.

Learning Outcomes: The students will be able to

1. The course will provide an understanding of the major schools of geographical thought.
2. Students became aware of rise of dualism and green revolution.
3. Student will identify the fundamental concepts and approaches in geography.

Unit No.	Descriptions	No. of Lectures	No. of Credits
1	Introduction: 1.1 The field of Geography: Its place in the classification of sciences 1.2 Fundamental Concepts 1.3 Development of Geography through ages, the ancient and	15	1

	<p>medieval period</p> <p>1.4 Age of exploration and impact of discoveries on the development of geography</p>		
2	<p>The Foundation of Scientific Geography</p> <p>2.1 Dualism the myth and realism, dualism between Regional and Systematic Geography, dualism between Physical and Human geography.</p> <p>2.2 Philosophical foundation of scientific geography</p> <p>2.3 Development of concepts: Environmental - Determinism, Possibilism</p>	15	1
3	<p>Founders of Modern Geography</p> <p>3.1 Carl Ritter</p> <p>3.2 Alexander Von. Humboldt</p> <p>3.3 Vidal-de-la-Blache</p> <p>3.4 H. J. Mackinder</p> <p>3.5 Richard Hartshorne</p>	15	1
4	<p>Approaches, Measurement and Explanation in Geography</p> <p>4.1 Approaches in Geography: i) Positivism, ii) Humanism, iii) Radicalism, iv) Behaviouralism</p> <p>4.2 Measurement and explanation in Geography: Laws, theories and models in geography – Quantitative Revaluation</p> <p>4.3 Paradigms and Philosophy in Geography, Paradigm shift</p>	15	1

Reference Books:

1. Abler, Ronald; Adams, Johan, S. Gould, Pater, Spatial Organization; The Geographer's View of the World, Prentice Hall, N. J. 1971.
2. Ali, S.M. The Geography of Puranas, Peoples Publishing House, Delhi 1966
3. Amedeo, Douglas: An Introduction to Scientific Reasoning in Geography, John Wiley, U.S.A.1971.
4. Dikshit, R.D. (ed) The Art & Science of Geography-Integrated Readings, Prentice Hall of India, New Delhi, 1994
5. Hartshorne, R.: Perspectives on Nature of Geography, Rand MC Nally & Co. 1959.
6. Husain, M: Evolution of Geographic Thought Rawat Pub. Jaipur, 1984
7. Johnston, R.J. Philosophy and Human Geography Edward Arnold London, 1983
8. Johnston, R.J. The Future of Geography Methoun, London, 1988

9. Minshull, R. The Changing Nature of Geography, Hutchinson University Library, London, 1970.

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Structure of Syllabus (NEP 2020)

M.A./M.Sc. Part II Semester IV

Name of the Paper: Political Geography (4.1)

Paper Code: DSE-4

Total Lectures: 60

Course Credits: 04

Total Marks: 100

Objectives :

1. To understand the basic concepts in political geography.
2. To enhance awareness of Multi-dimensional nature of geo-political space.
3. To make acquaint the students with nature of Geographical factors influencing the geopolitical situations in India and world.
4. To get the students familiar with different components of nation building.

Learning Outcomes: The students will be able to

- 1 The course will be providing an understanding composition of recent trends in political geography.
- 2 Students will also learn the different types of boundary lines and its political issues,
- 3 Students will be achieving the knowledge about popular theories of heartland and rimland

Unit No.	Title of the Unit	No. of Lecture	No. of Credits
	Introduction to Political Geography : 1.1 Political Geography: Definition, Nature and Scope of Political Geography,		

1	1.2 Approaches of the study Political Geography, Recent trends in political geography, Geographic elements of state 1.3 Physical, human and economic elements, Political Geography and environment interface.	15	1
2	Themes In Political Geography 2.1 Themes in Political Geography: State and nation, nation-state 2.2 Nationalism, nation building, Frontiers and Boundaries. 2.3 Capital Classification, functions and world power perspectives on one core periphery.	15	1
3	Theoretical frame work and Geopolitics 3.1 Global Strategic Models (Theory of Heartland), Spykman and Mahan's sea power concept, its relevance to contemporary, 3.2 World situation, Geopolitical significance of Indian ocean, 3.3 Political Geography of SAARC region, South-east Asia, west Asia.	15	1
4	Contemporary Issues and problems 4.1 Political geography of contemporary-India with special reference to: the changing Political map of India. 4.2 Unity-diversity, central and centrifugal forces, Stability and instability, Inter-state issues (like water disputes, riparian claims) and conflicts resolutions 4.3 Belgaum border dispute 4.4 Insurgency in border state, emergence of new states, federal India- Unity in diversity	15	1

Reference Books:

- 1 Bhagwati, J. N. (Ed) New International Economic Order – The North –South Debate. M.I.T. Press, London, 1976.
- 2 Dikshit, R.D. Political Geography: A Contemporary Perspective, Tata McGraw-Hill Publishing Company. New Delhi, 1982
- 3 Glassner M.I. Political Geography, John Wiley, New York, 1993
- 4 Panikkar, K.M. Geographical factors in Indian History. Bharatiya Vidya Bhavan, Bombay, 1956
- 5 Pounds N.T. Political Geography McGraw Hill, New York, 1972
- 6 Prescott, J.R.V. Political Geography Methouen & Co. London, 1972

- 7 Schwartzberg, J.E. A Historical Atlas of South Asia, University of Chicago Press, U.S.A. 1993.
- 8 Short J. R. An Introduction to Political Geography, Routledge and Kegan Paul, London, 1982
- 9 Taylor P. J. (Ed), Political Geography of the 20th Century – A Global Analysis, New York 1993.
- 10 Taylor, Peter: Political Geography, Longman, London, 1985.
- 11 William C.H. (Ed), Political Geography of the New World Order Halsted Ben, New York, 1993.

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Structure of Syllabus (NEP 2020)

M.A./M.Sc. Part II Semester IV

Name of the Paper: Geography of Tourism (4.2)

Paper Code: DSE-4

Total Lectures: 60

Course Credits: 04

Total Marks: 100

Objective:

- i) To acquaint the students with the role of geographical factors, viz; Physical, demographic social & economic, influencing the spatial distribution of Tourism.
- ii) To familiarize students with tourism industry.
- ii) To understand emerging development tourism industry.
- ii) To understand the scope and role of tourism in the world as well as Indian Economy.
- iii) Encouraging the student to involve in tourism industry.

Learning Outcomes ;

- i) The course will provide an understanding of tourism.
- ii) The course will provide student will illustrate the scenario of tourism development in India
- iii) Student will analyze the positive and negative impact of tourism.
- iv) Students will be achieving the knowledge about problems of tourism in India. and to suggest remedial measures.

Unit No	Details	Lectures/ Periods	No of Credits
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1	Basics of Tourism; Definition of tourism; Factors influencing on tourism: Types of tourism-cultural, coastal, Concept of Agro-Tourism and Pro-Poor Tourism, elements of tourism as an industry.	15	1
2	Indian Tourism: State wise regional dimensions of tourist attractions; promotion of tourism.(Roll of Center and State) Resources & growth of tourism, tourism policies in India. .Roll of Infrastructure and support system- accommodation and supplementary accommodation; other facilities and amenities; Tourism circuits- short and longer detraction – Agencies and intermediacies	15	1
3	Impacts of tourism: Physical, economic and social and perceptual; positive and negative impacts; Globalization and tourism.- Role of foreign capital and impact of globalization on tourism. Impact of tourism on Indian Economy	15	1
4	Tourism in the State of Maharashtra: Geographical, historical and cultural Factors influencing tourism. Types of tourism, Impact of tourism on environment; Physical and cultural Any one Project report on relevant topic such as impact of Tourism on Drought Prone Area Development, Rural Tourism, Agro-Tourism, lakes, historical, cultural centers & beaches in the State of Maharashtra.	15	1

References

- 1.Bhatia A.K.: Tourism Development Principles and Practices; Sterling Publishers, New Delhi 1996.
- 2.Bhatiya, A.K. International Tourism – Fundamentals and Practices; Sterling New Delhi (1991).
- 3.Chandra R.H.: Hill Tourism Planning and Development Kanishka publishers; New Delhi – 1998.
- 4.Kaul R.K. Dynamics of Tourism & Recreation Inter-India New Delhi 1985.
- 5.Kaul J: Himalayan Pilgrimages & New Tourism; Himalayan Books, New Delhi 1985.
- 6.Lea. J.: Tourism and Development in the Third World, Routledge, London 1988.
- 7.Milton D: Geography of World Tourism Prentice Hall, New York 1993.
- 8.Pearce D.G.: Tourism To-day A Geographical Analysis, Harlow, Longman, 1987.
- 9.Robinson, H. A.: Geography of Tourism, Macdonald and Evans, London, 1996.
- 10.Sinha P.C. (ed): Tourism Impact Assessment, Anmol Publishers, New Delhi, 1998.

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Structure of Syllabus (NEP 2020)

M.A./M.Sc.Part II Semester IV

Name of the Paper: Research Project in Geography-II

Paper Code: RP-2

Total Lectures: 60

Course Credits: 04

Total Marks: 100

Objectives:

1. To provide students with the opportunity of undertaking research.
2. To enable them to comprehend preliminaries and components of research project.
3. To get the students acquainted with the preparation of research proposal.
4. To enable the students to complete the research project by following the procedure.

5. To help the students present their research findings and defend their research conclusions.

Learning outcomes: At the end of the course students will be able to:

1. Understand the significance of research in the geographical studies.
2. Comprehend different constituents of research project.
3. Realize systematically the research aims and objectives, with their realization.
4. To apply the expertise and skills of research to other areas also.
5. To develop themselves into competent researchers.

Unit No.	Descriptions	No. of Lectures	No of Credits
Section-I			
I	Carrying out Research Project 1.1 Assessment of day-to-day research work 1.2 Methods of data collection 1.3 Analysis of Statistical data collected 1.4 Effective use of different research tools	15	01
II	Preparing Research Proposal 2.1 Adopting research methodology 2.2 Plan of research project 2.3 Selecting references / bibliography 2.4 Preparing research proposal / synopsis	15	01
Section-II			
I	The students individually or a batches of not exceeding 15 are required to select a problem for the project report. They are expected to carry out field work to generate primary data regarding the problem. By analyzing the data so evolved students should prepare a report and submit it in office for final examination and viva-voce.	30	02

Reference Books:

1. Ahuja Ram, – Research Method
2. Archet J. E. Dalton T. H. (1968): The fieldwork in geography, Batsford Ltd., London.

3. Borase: An Introduction of Research Method, (2005)
4. Dr. Mundkur, Suman. Develop an Effective Research Proposal. Notion Press, 2023.
5. Hamid, Mohomed. How to Write a Research Proposal and Thesis. C I Publications, 2023.
6. HamingLiroyed (1975): Scientific Geographic Research, W C Brow Company U.S.A.
7. Hans Raj (1988): Theory and Practice in Social Research, Surjeet Publication, 7-K, Kolhapur
8. John H. B., Dr. Mini Agrawal. Basics of Research Methodology. Redshine Publication, 2023.
9. Johnes P. A.: Field work in Geography, – Longman
10. Kothari C. R. (1996): Research Methodology, – VishwasPrakashan, New Delhi
11. Misra R. P. (1991): Research Methodology in Geography, Concept publication New Delhi
12. Walliman, Nicholas. Your Research Project. Sage South Asia, 2011.

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Structure of Syllabus (NEP 2020)

M.A./M.Sc. Part II Semester IV

Name of the Paper (Practical Paper): Introduction to GIS and GPS

Paper Code: DSC-7 (P)

Total Lectures: 60

Course Credits: 02

Total Marks: 50

Objectives:

1. Introduce to GIS and GPS concept and terminology.

2. To give detailed knowledge about the GIS Software.
3. Familiarize readers with GIS and GPS file formats.

Learning Outcomes: -

1. The course will provide an understanding the fundamentals of GIS and GPS.
2. Students became aware of digital cartography.
3. Student will identify the online resources for GIS and GPS application.

Unit No.	Description	No. of Lectures	No. of Credits
1	Geographical Information System 1.1 Definition, Purpose, Components, Advantages and disadvantages of GIS 1.2 Functions and application areas of GIS 1.3 Data Structure-Raster and Vector, Data input and Data Management, Query, Analysis and Visualization 1.4 ArcGIS/QGIS/KOSMO/Global Mapper – To prepare following Maps with the help of any GIS Software-Digitization, Access online data, Terrain analysis, Cartographic symbolization and Map designs	30	01
2	Global Positioning System 2.1 Definiton, Concept of GPS, Type of GPS, GPS Satellite, Data Receivers and Control Points 2.2 Functional Segments and Application of GPS 2.3 GPS Signals and Errors 2.4 Collection of Locational data using handheld GPS or Mobile GPS Apps	30	01

Reference Books:

1. Barrett E.C. and L.F. Curtis (1992): Fundamentals of remote sensing and air photo interpretation – Mcmillon, New York
2. BasudebBhatta (2016): Remote Sensing and GIS, Oxford University Press, New Delhi.
3. Comphell J. (1989): Introduction to remote sensing, Fuildord, New York.
4. Curran Paul. J. (1985): Introduction of remotes sensing, londman, London.

5. Ian, Haywood & others (2006): Geographical Information System, pearson Education, Inc., Delhi.
 6. Jamwal, Anil K. (2008): Geographical Information System, JnanadaPrakashan, New Delhi.
 7. Kang-Tsung Chang (2017): Introduction to Geographic Information Systems, McGraw Hill Education (India) Private Ltd. Chennai
 8. Leuder D.R. (1959): Areal Photographic interpretation, Mc grew Hill Book Company, New York.
 9. Lillesand I. M. and Kiefer R. W. (1979): Remote sensing and image interpretation, John Willey & Sons New York
 10. Sabins F. F. Jour (1987): Remote sensing principal of interpretation, (II edition) W.H.Freeman and Company, New York.
 11. Saini R. R. Kalwar S. C. (1991): Remote sensing in geography, pointer Publishers, Jaipur.
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Structure of Syllabus (NEP 2020)

M.A./M.Sc. Part II, Semester IV

Name of the Paper (Practical Paper): Computer Application in Geography

Paper Code: DSC-8 (P)

Total Lectures: 60

Course Credits: 02

Total Marks: 50

Objectives:

1. To understand the terms, concepts, involved in computer.
2. To familiarizes with geographical data and data structure.
3. To acquaint the student to the computer cartography.
4. To analyze statistical data using computer.

Learning Outcomes : The students will be able to

1. Students became aware of evolution and generations of computer.
2. Students became aware of Data structure.
3. Student will identify geographical data and its types.

Unit No.	Descriptions	No. of Lectures	No of Credits
I	Computer and Geographic Data 1.1 Classification of Geographical Data: Source of Data, Scales/Levels of Measurement, Spatial component, Dimensionality and Temporal data, Data Structure and Location of data	30	01
II	Computer in Cartography 2.1 Representation of geographical data: Line graph, Bar graph, Histogram, Scatter diagram, Pie diagram, Radar diagram 2.3 Statistical Analysis with Computer: Measures of Central Tendency, Quartile deviation, Standard deviation, Correlation 'r' value and Trend line	30	01

Reference Books:

1. Cole and King (1968)- Quantitative Geography
2. D. J. Unwin & J. A. Dawson (1987)-Computer Programming for Geographer, Longman London
3. David J. Magthre (1989)- Computer in Geography, Longman Scientific and Technical, London.
4. Himmond B. (1974)- Quantitative Technique in Geography, Clarendon press – Oxford
5. Paul M. Mather (1993)-Computer Application in Geography, John Wiley & Sons, New York, U. S. A.
6. RustanShorff- Computer System and Application
7. Sinha & Sinha (2005)- Computer System a Application, BPB publication, New Delhi

Structure of Syllabus (NEP 2020)

M.A./M.Sc. Part II Semester IV

Name of the Paper: (Practical Paper): Application of Remote Sensing (4.1)

Paper Code: DSE- 4 (P)

Total Lectures: 60

Course Credits: 02

Total Marks: 50

Objectives:

1. Make students familiar with concept of aerial photographs.
2. To give detailed knowledge about photogrammetry.
3. Make students familiar with parallax bar and satellite images.

Learning Outcome: The students will be able to

1. The course will provide an understanding the fundamentals of Remote Sensing.
2. Students became aware of digital image process.
3. Student will identify the scale using various methods.

Unit No.	Descriptions	No. of Lectures	Credit
I	Photogrammetry 1.1 Scale and resolution of photo 1.2 Area measurement 1.3 Determination of scale by various methods 1.4 Determination of flying height, focal length and height of object 1.5 Relief displacement and height determination 1.6 Introduction to parallax, parallax measurement and height determination 1.7 Determination of overlap 1.8 Determination of photo coverage area and cost of photographs	30	01
II	Types and Visual interpretation of satellite image 2.1 Earth Resources Satellites and Meteorological satellites 2.2 Visual Interpretation -Landuse and Landforms	30	01

Reference Books:

1. Barrett E.C. and L.F. Curtis (1992): Fundamentals of remote sensing and air photo interpretation – Mcmillon, New York
2. BasudebBhatta (2016): Remote Sensing and GIS, Oxford University Press, New Delhi.
3. Curran Paul. J. (1985): Introduction of remotes sensing, londman, London.
4. Comphell J. (1989): Introduction to remote sensing, Fuildord, New York.
5. Kang-Tsung Chang (2017): Introduction to Geographic Information Systems, McGraw Hill Education (India) Private Ltd. Chennai
6. Lillesand I. M. and Kiefer R. W. (1979): Remote sensing and image interpretation, John Willey & Sons New York
7. Leuder D.R. (1959): Areal Photographic interpretation, Mc grew Hill Book Company, New York.
8. Saini R. R. Kalwar S. C. (1991): Remote sensing in geography, pointer Publishers, Jaipur.
9. Sabins F. F. Jour (1987): Remote sensing principal of interpretation, (II edition) W.H.Freeman and Company, New York.
10. Ian, Haywood & others (2006): Geographical Information System, pearson Education, Inc., Delhi.
11. Jamwal, Anil K. (2008): Geographical Information System, JnanadaPrakashan, New Delhi.

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Structure of Syllabus (NEP 2020)

M.A./M.Sc. Part II Semester IV

Name of the Paper: (Practical Paper): Map Projection and Cartography (4.2)

Paper Code: DSE- 4 (P)

Total Lectures: 60

Course Credits: 02

Total Marks: 50

Objectives:

- 1.To understand terms and types of Map projection.
- 2.To understand the students various Cartographic techniques.

Learning Outcomes: The students will be able to

1. The course will provide an understanding difference between various map projections.
2. The Students will also achieve the skill of various cartographic techniques and map projection.

Unit No.	Details	Lectures/ Periods	No of Credits
1	1.1 The Earth: shape and size; Datum and co-ordinate systems; Geographical co-ordinate, Projected co-ordinate and grid system. 1.2 History and Development of Cartography, Sources of cartographic data, Scale: types & importance, 1.3 Cartographic methods and techniques for preparation of maps and diagrams, General maps: types and applications, Thematic maps: types and applications	30	1
2	2.1 Choice and classification of map projections. 2.2 Construction, properties and uses of projections: 1) Stereographic Polar Zenithal projection. 2) Orthographic Polar Zenithal Projection. 3) Bonne's Conical Projection. 4) Conical Equal Area Projection with one standard Parallel 5) Simple Cylindrical Projection. 6) Cylindrical Equal Area Projection	30	1

References:

1. Hofmann-Wellenhof, B.,and Moritz, H. (2006):Physical Geodesy (2nd d.),springer, 420pp.
2. Iliffe, J., and Lott, R. (2008):Datums and Map Projections for Remote sensing, GIS, and Surveying (2nd Ed.), Whittles Publishing,192pp.

3. Kaplan, E.D., and Hegarty, C.J. (2006): Understanding GPS: Principles and Applications (2nd Ed.), Artech house, Norwood, MA, USA, 724pp.
4. Kimerling, J., Buckley, A.R., Muehrcke, P.C., and Muehrcke, J.O. (2011): Map Use: Reading, Analysis, Interpretation (7th Ed.), ESRI Press, 620pp.
5. Krygier, J., and Wood, D. (2011): Making Maps: A Visual Guide to Map Design for GIS (2nd Ed.), The Guilford Press, New York, 256pp.
6. Lo, C.P., and Yeung, A.K.W. (2006): Concepts and Techniques of Geographic Information Systems (2nd Ed.), Prentice hall, 544pp.
7. Misra, R.P., and Ramesh, A. (1999): Fundamentals of Cartography, Concept Publishing, New Delhi.
8. Nathanson, J.A., Lanzafama, M., and Kissam, P. (2010): Surveying Fundamentals and Practices (6th Ed.), Prentice Hall, 360pp.
9. Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J., and Guptill, S.C. (1995): Elements of Cartography (6th Ed.), Wiley, New York, 688pp.
10. Singh, R.L., and Singh, R.P.B. (1993): Elements of Practical Geography, Kalyani Publishers, New Delhi, India.
11. Slocum, T.A., McMaster, R.B., Kessler, F.C., and Howard, H.H. (2008): Thematic Cartography and Geovisualization (3rd Ed.), Prentice Hall, 576pp.
12. Dent, B., Torguson, J., and Hodler, T. (2008): Cartography: Thematic Map Design (6th Ed.), McGraw-Hill, 368pp.