PANJAB UNIVERSITY, CHANDIGARH-160014 (INDIA)

(Estd. under the Panjab University Act VII of 1947- enacted by the Govt. of India)

FACULTY OF ARTS

SYLLABI

FOR

M.A. GEOGRAPHY (SEMESTER SYSTEM)

Examinations, 2023-24, 2024-25, and 2025-26

APPLICABILITY OF REGULATIONS FOR THE TIME BEING IN FORCE

Notwithstanding the integrated nature of a course spread over more than one academic year, the regulations in force at the time a student joins a course shall hold good only for the examinations held during or at the end of the academic year. Nothing in these regulations shall be deemed to debar the University from amending the regulations subsequently and the amended regulations, if any, shall apply to all students whether old or new.

GUIDELINES FOR CONTINUOUS INTERNAL ASSESSMENT (20%)
for Regular Students of Post-Graduate Courses of Geography (Semester System)

(Effective from the First Year Admissions for the Academic Session 2023-2024)

1. The Syndicate has approved the following guidelines, mode of testing and evaluation including Continuous Internal Assessment of students:
   (i) Terminal Evaluation : 80% (Theory 50% and Practical 30% as specified in syllabus)
   (ii) Continuous Assessment: 20 %
   (iii) Continuous Assessment may include written assignment, snap tests, participation in discussions in the class, term papers, attendance etc.
   (iv) In order to incorporate an element of Continuous Internal Assessment of students, the Colleges/Departments will conduct the following:

(a)	Written Test:	25 (reduced to 5)
(b)	Snap Test:	25 (reduced to 5)
(c)	Participation in Class discussion:	15 (reduced to 3)
(d)	Term Paper:	25 (reduced to 5)
(e)	Attendance:	10 (reduced to 02)
		Total: 100 reduced to 20

2. Weightage of 2 marks for attendance component out of 20 marks for Continuous Assessment shall be available only to those students who attend 75% and more of classroom lectures/seminars/workshops. The break–up of marks for **attendance component** for theory papers shall be as under:

	Attendance Component	***Mark/s for Theory Papers***
(a)	75 % and above upto 85 %:	1
(b)	Above 85 %:	2

3. It shall **not be compulsory** to pass in Continuous Internal Assessment. Thus, whatever marks are secured by a student out of 20 marks, will be carried forward and added to his/her score out of 80, i.e., the remaining marks allocated to the particular subject and, thus, he/she shall have to secure pass marks both in the University examinations as well as total of Internal Continuous Assessment and University examinations.

4. Continuous Internal Assessment awards from the affiliated Colleges/Departments must be sent to the Controller of Examinations, by name, **two weeks before** the commencement of the particular examination on the *proforma* obtainable from the Examination Branch.

Outlines of Tests, Syllabi and Courses of Reading in the Subject of Geography for M.A. (Semester System) Examination 2023-24

Course Code	Title	Marks	Credits
	Semester-I		
GEOG 101	Geographic Thought	100	4
GEOG 102	Geomorphology	100	4
GEOG 103	Cartography (Theory and Practical)	100	4
GEOG 104	*Any **one** of the following optional courses:*		
Option (i)	Fundamentals of Population Geography	100	4
Option (ii)	Fundamentals of Agricultural Geography	100	4
Option (iii)	Political Geography	100	4
Option (iv)	Geography and Ecosystems	100	4
Option (v)	Contemporary Issues in Human Geography	100	4
	Total:	***400***	***16***
	Semester-II		
GEOG 201	Climatology	100	4
GEOG 202	Geography of India (Systematic and Regional)	100	4
GEOG 203	Fundamentals of Remote Sensing (Theory and Practical)	100	4
GEOG 204	*Any **one** of the following optional courses:*		
Option (i)	Cultural Geography	100	4
Option (ii)	Population and Development Planning	100	4
Option (iii)	Fundamentals of Natural Hazards and Disaster Management	100	4
Option (iv)	Marketing Geography	100	4
Option (v)	Geography of Water Resources	100	4
Option (vi)	Administrative Geography	100	4
	Total:	***400***	***16***
	Semester-III		
GEOG 301	Town and Country Planning	100	4
GEOG 302	Research Methodology in Geography	100	4
GEOG 303	Fundamentals of GIS and GPS (Theory and Practical)	100	4
GEOG 304	*Any **one** of the following optional courses:*		
Option (i)	Regional Development and Planning in India	100	4
Option (ii)	Special Themes in Agricultural Geography	100	4
Option (iii)	Biogeography	100	4
Option (iv)	Social Geography	100	4
Option (v)	Political Geography of India	100	4
Option (vi)	Applied Climatology	100	4
	Total:	***400***	***16***
	Semester-IV		
GEOG 401	Regional Planning	100	4
GEOG 402	Dissertation (Practical only)	100	4
GEOG 403	Quantitative Methods in Geography (Theory and Practical)	100	4
GEOG 404	*Any **one** of the following optional courses:*		
Option (i)	Urban Geography	100	4
Option (ii)	Geography of Food Security	100	4
Option (iii)	Qualitative Research Methods in Geography	100	4
Option (iv)	Climate Change and Earth System	100	4
	Total:	***400***	***16***
	GRAND TOTAL (I, II, III, IV)	**1600**	**64**

SEMESTER-I

GEOG 101: GEOGRAPHIC THOUGHT

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To acquaint the students with the development of Geography as a field of study.
- To familiarise them with the philosophical underpinnings of the discipline.
- To enable them to understand the development of Geography in the context of developments in the larger arena of knowledge.

COURSE CONTENT

Unit-I

Foundations of Geography- I

i. Contributions of the Greeks and Romans with special reference to Herodotus, Eratosthenes, Strabo and Ptolemy
ii. Geography in the Middle Ages: Contributions of Arabs; Dark Ages in Europe
iii. Geography and the Renaissance; Geography and the age of explorations and discoveries

Unit-II

Foundations of Geography- II

iv. Pre-Classical and Classical Geography: Contributions of Bernhard Varenius, Immanuel Kant, von Humboldt and Carl Ritter
v. Darwinism in Geography, Environmental Determinism and Possibilism
vi. Regional Geography: French and British School, Geography as study of Areal Differentiation

Unit-III

Quest for a Scientific Flavour

vii. Positivism, Schaefer and Geography as a Spatial Science, Quantitative Revolution
viii. Scientific Method in Geography
ix. Criticism of Positivism, Radicalism, Humanism, Behavioralism

Unit-IV

Recent Trends and Ideas

x. Post-modernism in Geography
xi. Cultural Turn and Spatial Turn
xii. Feminism and Post-Feminism in Geography

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Gosal, G. S.: *History of Geographic Thought*, Panjab University Press, Chandigarh, 2015.
2. Nayak, A. and A. Jeffrey.: *Geographical Thought*, Routledge, London and New York, 2016.
3. Dikshit, R. D. (ed.): *Geographical Thought: A Contextual History of Ideas*, Prentice Hall of India, New Delhi, 1999.
4. Dikshit, R. D. (ed.): *The Art & Science of Geography, Integrated Readings*, Prentice Hall of India, New Delhi, 1994.
5. Hartshorne, R.: *Perspectives on the Nature of Geography*, Rand McNally & Co., 1959.
6. Harvey, D.: *Explanation in Geography*, Edward Arnold, London, 1973.
7. Martin, G.: *All Possible Worlds, A History of Geographical Ideas*, 4th Edition, Oxford University Press, New York, 2005.
8. Peet, Richard: *Modern Geographical Thought*, Blackwell, Massachusetts, First Indian Reprint, 2004.
9. Jensen, A.H.: *Geography: Its History and Concepts*, Sage Publications, Thousand Oaks, New Delhi, 2009.
10. Livingstone, D. *The Geographical Tradition*, Blackwell, Oxford, 1993.

Further Readings:

1. Abler, Ronald F. Marcus, Melvin, G. Olson, Judy, M.: *Geography's Inner Worlds Pervasive Themes in Contemporary American Geography*, Rutgers University Press, New Jersey, 1992.
2. Abler, Ronald, Adams, John S. and Gould, Peter: *Spatial Organization: The Geographer's View of the World*, N. J., Prentice Hall, 1971.
3. Board, Christopher, R.J., Haggett, P., Stoddart, D.R. (ed.): *Progress in Geography: International Review of Current Research*, Vol. I to VIII, Edward Arnold, London.
4. Johnston, R. J. & Claval, P.: *Geography Since the Second World War: An International Survey*, Crown Halm, Sydney, 1984.
5. Johnston, R. J. and Sidaway, J.D.: *Geography and Geographers: Anglo-American Human Geography Since 1945*, Arnold, London, 2004.

Pedagogy: The students are to be encouraged to interact with students from other streams of knowledge i.e., physical, social sciences and humanities for a proper grounding into geography. All issues relating to philosophy, methodology and history of the discipline are to be explained by asking the students to prepare write ups on specific problems.

GEOG 102: GEOMORPHOLOGY

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: This course aims at developing an understanding of important geomorphic concepts, processes and mechanisms that control the development of landscapes. It intends to enable students to comprehend the interrelationships of processes, landforms, material and time.

COURSE CONTENT

Unit-I

i. Nature, Scope, Approaches and Recent Developments.
ii. Important Concepts in Geomorphology.

Unit–II

iii. Earth: Interior Structure and Isostasy
iv. Earth Movements: Plate Tectonics, Types of Folds and Faults, Earthquake and Volcanoes

Unit-III

v. Geomorphic Processes: Weathering, Mass Wasting
vi. Evolution of Landforms (Erosional and Depositional): Fluvial, Glacial, Aeolian and Karst
vii. Glacial and Marine Landforms and Processes

Unit-IV

viii. Models of Landscape Evolution and Slope Development: Ideas of Davis, Penck, and King
ix. Applied Geomorphology: Applications of Geomorphology in Natural Hazards, Environmental Management, Urban Geomorphology and Global Warming

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 parts in about 25-30 words each. Each part shall carry 2 marks (total 20 marks).
2. A total of eight questions will be set out of the whole syllabus at least *two* from each unit. The candidates will attempt *four* questions selecting one from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks.
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Bartolomé, A., Francisco, C., Juan, J. D., James W.: *Advances in Research in Karst Media*, Springer Heidelberg Dordrecht, London, New York, 2010.
2. Bierman, P. and Montgomery, D.: *Key Concepts in Geomorphology - 14 edition,* W.H. Freeman, U.K. 2014.
3. Bird, E.: *Coastal Geomorphology: An Introduction 2nd Edition, Wiley,* 2008.
4. Bloom, Arthur L.: *Geomorphology: A Systematic Analysis of Late Cainozoic Landforms*, Pearson Education, Singapore, 3rd Edition, 2003.
5. Bridge, J.S.: *Rivers and Floodplains: Forms, Processes, and Sedimentary Record*, Wiley-Blackwell, UK, 2003.
6. Bridge, J. and Demicco, R.: *Earth Surface Processes, Landforms and Sediment Deposits,* Cambridge University Press, New York, 2008.
7. Burbank, D.W. and Anderson, R.S.: *Tectonic Geomorphology 2nd edition,* Wiley-Blackwell, UK, 2012.
8. David, S.G. Thomas: *Arid Zone Geomorphology: Pattern, Form and Change in Dry Lands,* Wiley Blackwell, New York, 2011.
9. Douglas, W.B., Robert, S.A.: *Tectonic Geomorphology*, Wiley Blackwell, New York, 2011.
10. Goudie, A. and Viles, H.: *Landscapes and Geomorphology: A Very Short Introduction,* Oxford University Press, 2010.
11. Goudie, A.S.: *Arid and Semi-arid Geomorphology*, Cambridge University Press, England, 2013.
12. Gregory, K.J.: *The Earth's Land Surface: Landforms and Processes In Geomorphology*, Sage Publications (CA), 2010.
13. Leopold, L.B., Miller, J.P. and Wolman M.G.: *Fluvial Processes in Geomorphology,* Dover Publications, 1995.
14. Masselink, G., Hughes, M. and Knight, J.: *Introduction to Coastal Processes and Geomorphology 2nd Edition,* Routledge, 2011.
15. Richard, J.H.: *Fundamentals of Geomorphology*, Routledge, Taylor & Francis Group, London, 2011.
16. Ritter, D.F., Kochel, R.C. and Miller, J.R.: *Process Geomorphology 5th edition*, Waveland Press Inc., Long Grove, Illinois, 2006.
17. Scroder, J.F.: *Treatise on Geomorphology*, Elsevier, London, 2013.
18. Singh, Savindra: *Geomorphology*, Prayag, Prakashan, Allahabad, 1998.

Further Readings:

1. Chorley, R.J., Beckinsale, R.P. and Dunn, A.J.: *The History of the Study of Landforms or The Development of Geomorphology*, Volume One: Geomorphology Before Davis, Routledge, London, 1964.

2. Chorley, R.J., Beckinsale, R.P. and Dunn, A.J.: *The History of the Study of Landforms or The Development of Geomorphology*, Volume Two: The Life and Work of William Morris Davis, Methuen & Co. Ltd., London, 1973.
3. Chorley, R.J. and Beckinsale, R.P.: *The History of the Study of Landforms or The Development of Geomorphology,* Volume 3: Historical and Regional Geomorphology 1890–1950, Routledge, London, 1991.
4. Davis, W. M.: *Geographical Essays*, Dover, Boston, 1909.
5. King, L.C.: *The Morphology of the Earth*, Hafner, New York, 1962.
6. Leopold, L.B.: *Water, Rivers and Creeks,* University Science Books, 1997.
7. Leopold, L.B.: *A View of the River,* Harvard University Press, 2006.
8. Penck, W.: *Morphologic Analysis of Landforms*, St. Marisip Press, London, 1953.
9. Skinner, B. J. and S.C., Porter: *The Dynamic Earth*, John Wiley, New York, 1995.
10. Strahler, Alan and Arthur Strahler: *Physical Geography: Science and Systems of the Human Environment*, John Wiley & Sons, New York, 3rd Edition, 2005.
11. Thornbury, W. D.: *Principles of Geomorphology*, John Wiley, New York, 1969.
12. Twidale, C.R.: *Structural Landforms*, A.N.U. Press, Canberra, 1971.
13. Wang, Chi-Yuen and Manga, M.: *Earthquakes and Water*, Lecture Notes in Earth Sciences, Springer- Verlag Berlin Heidelberg, 2010.

Pedagogy: The study of this paper needs adequate understanding of geomorphic forms and processes. It can be achieved through suitable use of audio-visual aids, photographs, maps, other forms of illustrations and depending upon feasibility, field visits.

GEOG 103: CARTOGRAPHY (Theory and Practical)

Max. Marks: 100
Theory Paper: 50 Marks
Practical Record and Viva-Voce (20+10): 30 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: To promote awareness of the M.A. students of the various cartographic techniques available for graphic representation of relief, population, agriculture, industrial and transport data, the steps of construction of the techniques–their merits and demerits. An effort is made to help them develop manual skills of drawing maps based on some of the above-mentioned data. They are also told about benefits of GIS and computer-assisted cartography.

COURSE CONTENT

Unit-I

i. Cartography: Nature, History and Recent Trends-GIS & Computer Assisted Cartography
ii. Types of Data and Symbols.

Unit-II

iii. Landform Mapping and Analysis: Elementary conventional methods (Contours, Spot heights, Hachures, Hillshading)
iv. Profiles: Transverse and Longitudinal.

Unit-III

v. Calculation of Gradient, scales of slopes, Slope analysis-Wentworth and Robinson.
vi. Mapping of climatic data: Temperature and Rainfall.

Unit-IV

vii. Representation of Population data
viii. Representation of Agriculture data.

Note:

1. A compulsory question containing 10 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 7 questions in about 25-30 words each. Each question shall carry 2 marks (total 14 marks).

2. A total of eight questions will be set out of the whole syllabus, at least *two* from each unit. The candidates will attempt *four* questions selecting one from each unit carrying nine marks (total 36 marks). These will be in addition to the compulsory question at serial number 1.
3. Each candidate shall prepare a Practical File under the supervision and guidance of the teacher concerned. The candidate shall submit his Practical File at least 10 days before the commencement of the theory examination to the concerned department duly approved and signed by the faculty member teaching the course.
4. Assessment of practical record and viva voce on it will be done by a Board of Examiners, consisting of one external examiner and one internal examiner, as practical examinations.
5. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.

LIST OF READINGS

Essential Readings:

1. Bolstad, P.: *GIS Fundamentals: A First Text on Geographic Information Systems*, Second Edition, White Bear Lake, MN: Eider Press, 2005.
2. Crampton, W. C.: *Mapping: A Critical Introduction to Cartography and GIS*, John Willy & Sons, New York, 2010.
3. Field, Kenneth, *Cartography, Esri Press,* 2018
4. Harvey, Francis: *A Primer of GIS, Fundamental Geographic and Cartographic Concepts*, The Guilford Press, 2008.
5. Heywood, I., Cornelius, S., and Carver, S.: *An Introduction to Geographical Information Systems,* Prentice Hall, 3rd Edition, 2006.
6. John Krygier and Denis Wood: *Making Maps: A Visual Guide to Map Design for GIS*, Guilford Publications, 2013.
7. Keates, J.S.: *Cartographic Design and Production*, Longman, London, 1998.
8. Misra, R.P. and Ramesh, A.: *Fundamental of Cartography*, Concept Publishing Company, New Delhi, 2014
9. Robinson, A.H. and Others: *Elements of Cartography*, John Wiley & Sons, New York, 6th Edition, 1992.

Further Readings:

1. Monkhouse, F.J.: *Maps and Diagrams*, Methuen and Co., London, 1994.
2. Raisz, Erwin: *Principles of Cartography*, McGraw Hill, New York, 1962.
3. Singh, R. L. and Singh, R.P.B.: *Elements of Practical Geography*, Kalyani Publishers, New Delhi, 2005.

Pedagogy: There should be adequate interaction between the teacher and students. The teacher should make maximum use of wall maps and other illustrations like maps from geography books, Ph.D. thesis, research reports and atlases while teaching the use of different cartographic techniques. This course is concerned with visual techniques; therefore, maximum use of the visual illustrations should be made while teaching this course.

GEOG 104: ANY ONE OF THE FOLLOWING OPTIONAL COURSES

OPTION (i): FUNDAMENTALS OF POPULATION GEOGRAPHY

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To explain the geographical approach to the study of population
- To focus on broad analysis of spatial patterns of attributes of population; population resource relationship and population problems and policies of developed and less developed countries.

COURSE CONTENT

Unit -I

i. Nature and scope of population geography; recent developments in population geography; population geography in India.
ii. Sources, quality and reliability of population data: census; surveys (national sample survey, national family health survey etc.); registration (national population register, vital statistics registration) miscellaneous sources.

Unit -II

iii. Concepts, determinants and world patterns of following attributes of population:
   a. Distribution and Density
   b. Population Dynamics: Fertility, Mortality and Migration (including laws of Migration)
   c. Growth
   d. Age and Sex Composition
   e. Urbanization

Unit -III

iv. Linkages between Population Growth and Economic Development.
v. Population Growth and Resource Scarcity (supply induced, demand induced; and structural scarcity) and Food Security

Unit -IV

vi. A comparative study of the population problems and policies of developed and less developed countries with special focus on the following countries:
   a. Developed: Canada, Japan.
   b. Less developed: China, India

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Barret, H.R.: *Population Geography*, Oxford & Boyd, Oxford, 1997.
2. Beaujeu Garnier, J.: *Geography of Population*, Longman, London, 1966.
3. Chandna, R.C.*: Geography of Population (10th Edition)* Kalyani Publishers, Ludhiana, 2016.
4. Clarke, J. I. (ed.): *Geography of Population: Approaches & Applications,* Pergamon Press, Oxford, 1984.
5. Demko, G.J. et. al: *Population Geography: A Reader*, McGraw Hill Books Co., New York, 2002.
6. Ghosh, B.N.*: Fundamentals of Population Geography,* Sterling Publication, 2005.
7. Hussain, M.: *Population Geography,* Rawat Publication, 2005.
8. Jones, H.R.: *A Population Geography*, Harper and Row Publishers, London, 1990.
9. Maurya, S.D.: *Population Geography*, Pravalika Publication, Allahabad, 2018
10. Newbold, K. Bruce*, Population Geography,* Rawat Publications, 2017.
11. Quazi, S.A.*: Population Geography,* APH Publishing Corporation, 2012.
12. Trewartha, G.T.: *The Less Developed Realm: A Geography of its Population*, John Wiley & Sons, Inc., New York, 1972.
13. Trewartha, G.T.: *The More Developed Realm: A Geography of its Population*, Pergamon Press, New York, 1978.

14. Weeks, R. John*: Population: An Introduction to Concepts and Issues,* Wadsworth Thomson Learning, Toronto, Canada, 11th Edition, 2012.
15. Newbold, K.B.: *Six Billion Plus: World Population in the Twenty-First Century,* Rowman and Littlefield Publishers, Inc., Lanham, 2007.

Further Readings:

1. Boyle, P.: *Population Geography: Migration and Inequalities in Mortality and Morbidity*, Progress in Human Geography, Sage Publications, 2004, http:// phg.sagepub.com
2. Chandna, R.C.: *Environmental Awareness*, Kalyani Publishers, New Delhi, 1998.
3. Crook, Nigel: *Principles of Population and Development*, edited by Ian, M. Timacus, Oxford University Press, Oxford, 1997.
4. Hugo, G.: Population *Geography Progress in Human Geography*, Sage Publications, 2007.
5. Peters, L. Gary: *Population Geography: Problem, Concepts and Prospects*, Kendeall/Hent Publishing Company, 2008.
6. Premi, M.K.: *India's Changing Population Profile*, National Book Trust India, New Delhi, 2009.
7. Robinson. W.C.: *Population & Development Planning*, The Population Council, New York, 1976.
8. U.N.D.P.: *Human Development Report*, Oxford University Press, Oxford, 1997.
9. Wood, Robert: *Theoretical Population Geography*, Longman Inc., New York, 1982.
10. Woods, R.: *Population Analysis in Geography*, Longman, London, 1979.
11. World Population Polices, Social & Economic Affair, United Nation, 2001-10 (annual).

Pedagogy: The students may be encouraged to interact with census officials so as to understand the census operations in the country. The students may also interact with the students from other disciplines, which study population in order to understand the geographical approach to the study of population.

OR

Option (ii): FUNDAMENTALS OF AGRICULTURAL GEOGRAPHY

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To familiarise the students with the basics in agricultural geography, starting from its nature, contents, progress, approaches, determinants etc., to the important concepts like cropping intensity, crop-concentration, crop pattern, crop combinations, diversification, commercialization, agricultural development etc.
- To provide them with the understanding of agricultural regionalization, Land use and land capability classifications as well as classification of agricultural types.

COURSE CONTENT

Unit-I

i. The nature, subject matter and progress in Agricultural Geography
ii. Approaches: (i) commodity, (ii) systematic, (iii) regional
iii. Determinants: (i) physical, (ii) economic, (iii) socio-cultural

Unit-II

iv. Selected agricultural concepts and their measurement
   a. Intensity of cropping
   b. Degree of commercialization
   c. Diversification and specialization
   d. Efficiency and productivity.

Unit-III

v. Land-use survey and classification (British and Indian)
vi. Land capability classification (U.S. and Britain)

Unit-IV

vii. A critical evaluation of the classification of world agriculture with reference to Whittlesey
viii. New perspectives in Agriculture: Contract Farming, Agri-business and Food Security

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings

1. Hussain, M.: *Systematic Agricultural Geography,* Rawat Publications, Jaipur, 1996.
2. Husain, M.: *Systematic Agricultural Geography*, Rawat Publications, Jaipur, 2004.
3. Ilbery, B. W.: *Agricultural Geography,* Oxford University Press, Oxford, 1985.
4. Pacione, Michael: *Progress in Agricultural Geography*, Routledge Revivals, 2013.
5. Singh, J. and Dhillon, S.S.: *Agricultural Geography*, Tata McGraw Hill, New Delhi, 1984.
6. Singh, Jasbir: *Agricultural Geography,* 3rd edition, Oxford, New Delhi, 2003.
7. Symons, L.: *Agricultural Geography,* G. Bells, London, 1967.

Further Readings:

1. Alexander, J.W.: *Economic Geography,* Prentice Hall, N.J., 1968.
2. Bryant, Adler: *Agricultural Economics and Agribusiness Management,* Syrawood Pub. House, 2016.
3. Gosal, G.S. and Krishan, Gopal: *Regional Disparities in Levels of Socio-Economic Development in Punjab,* Vishal Publications, Kurukshetra, 1984.
4. Grigg, D.B.: *The Agricultural Systems of the World: An Evolutionary Approach,* Cambridge University Press, Cambridge, 1978.
5. Hussain, M.: *Agricultural Geography,* Inter India Publications, Delhi, 1979.
6. Morgan, B.W. and Munton, J.C.: *Agricultural Geography,* Methuen, London, 1971.
7. Pacione, Michael: Progress in Agricultural Geography, Routledge, 2014.
8. Shafi, M.: *Agricultural Productivity and Regional Imbalances*, Concept, New Delhi, 1984.
9. Singh, Jasbir: *Dynamics of Agricultural Change*, Oxford, New Delhi, 1990.
10. Tarrant, J.R.: *Agricultural Geography,* Davis and Charles, Newton Abbot, 1974.
11. Whealler, K.E., Ladley, A.M. and Leong, F.C.: *Studies in Agricultural Geography,* Bland Educational, London, 1970.

Pedagogy: The course should fully acquaint the students with the understanding of agricultural geography as a developed branch of geography. The students should be made to learn the major concepts, factors affecting agricultural land use, different types of agricultural land use etc. by giving simple examples from their own and neighboring areas.

OR

Option (iii): POLITICAL GEOGRAPHY

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- The course is designed to acquaint the student with the conceptual framework for the study of geographical bases for political phenomena. The aim is to create awareness about the role of geographical factors in influencing political character of individual countries/regions.

COURSE CONTENT

Unit-I

i. Definition, approaches, scope and importance of Political Geography
ii. Study of different geographical-political schools of thought
iii. Recent developments in political geography

Unit-II

iv. Elements of Political Geography:
   a. Physical elements (location, size and shape)
   b. Human elements (Population - size, density & distribution, growth, composition, race, ethnographic and religious composition)
   c. Economic elements (Transportation - surface, air & water; foreign trade and investment).

Unit-III

v. Special themes in Political Geography:
   a. State and Nation
   b. Frontiers and Boundaries
   c. Geo-strategic views: The contributions of H. Mackinder, A.T. Mahan, N.J. Spykman

Unit-IV

vi. Federalism: Definition, concept, approaches and types, geography and federalism
vii. Place of electoral study in political geography; geographical approaches to the study of elections; Electoral abuse.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Alexander, I.M.: *World Political Patterns,* Rand McNally, Chicago, 1963.
2. De Blij, Harm J.: *Systematic Political Geography,* John Wiley & Sons, New York, 1973.
3. Dikshit, R.D.: *Political Geography-A Contemporary Perspective,* McGraw Hill, Delhi, 1985.
4. Fisher, Charles A.: *Essays in Political Geography,* Methuen & Co., London, 1968.
5. Houston, Edwin. J.: *The Elements of Physical Geography*, Forgotten Books, 2017.
6. Kasperson, R. E. (ed.): *The Structure of Political Geography,* Univ. of London Press, 1970.
7. Sudipta, Adhikari: *Political Geography,* Rawat Publications, Jaipur, 1997.

Further Readings:

1. Cartée, Cornelius Soule: *Elements of Physical and Political Geography*, ReInk Books, 2018
2. E. K. Bergman: *Modern Political Geography,* WMC Brown Company, Dubuque, Iowa, 1975.
3. Gauba, O.P.: *Indian Political Thought*, Mayur Paperback, 2016
4. Muir, Richard: *Modern Political Geography,* Macmillan, London, 1995.
5. Pounds, N.J.G.: *Political Geography,* 2nd Ed., McGraw-Hill, N.Y., 1972.
6. Short, John R.: *An Introduction to Political Geography,* Routledge & Kegan Paul, London, 1982.

Pedagogy: The students should be encouraged to engage in classroom discussions on the geographical aspects of political problems at the national and international levels.

OR

OPTION (iv): GEOGRAPHY AND ECOSYSTEMS

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To appraise the students of environmental processes, nature of interactions and linkages between biotic and abiotic elements.
- To sensitize students about human induced ecological changes in key biomes, biodiversity loss and conservation and ecological sustainability issues.

COURSE CONTENT

Unit –I

Ecosystems: Concepts and Characteristics

i. Ecosystem Approach: Definition, Characteristics and Components.
ii. Functional Characteristics: Food chains/webs; Trophic Levels and Ecological Pyramids
iii. Energy Flow and Nutrient Cycling, Ecological Succession

Unit II

Key Issues in Ecosystem Studies

iv. Ecosystem Stability and Disturbance; Ecological Change over Time and Space
v. Biodiversity: Importance; Causes of Biodiversity Loss and Hot spots.
vi. Ecological and Carbon Footprint, Environmental Sustainability

Unit –III

Major Ecosystems of the World

vii. Forest: Tropical, Temperate and Boreal Ecosystems
viii. Grassland: Tropical Grassland and Temperate Grassland Ecosystems
ix. Desert: Hot Desert and Cold Desert Ecosystem.

Unit –IV

Case Studies of Human Induced Ecological Changes:

x. Hill ecosystems with specific reference to Siwaliks
xi. Wetland ecosystems with specific reference the Punjab Wetlands
xii. Agricultural Ecosystems with specific reference to the Green Revolution in Punjab.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Allison, S.K. and Stephen D. Murphy: *Routledge Handbook of Ecological and Environmental Restoration*, Routledge, 2017.
2. Brar, K. K.: *Green Revolution: Ecological Implications*, Dominant Publishers, Delhi, 1999.
3. MacDonald, Glen: *Biogeography: Introduction to Space, Time, and Life*, John Wiley, New York, 2003.
4. Odum, E.P. and Barrett, G.W.: *Fundamentals of Ecology*, 5th edition, Cengage Learning India Private Limited: New Delhi, 2009.
5. Singh, Savindra: *Environmental Geography*, Pravalika Publications, Allahabad, 2018.

Further Readings:

1. Ellis, Erle C., Kees Klein Goldewijk, Stefan Siebert, Deborah Lightman and Navin Ramankutty: Anthropogenic transformation of the biomes, 1700 to 2000. *Global Ecology and Biogeography.* 19: 589–606, 2010.
2. Mathur, H.S.: *Essentials of Biogeography,* Pointer Publishers: Jaipur, 1988.
3. Steffen, W.: Jacques Grinevals, Paul Crutzen and J. McNeil. The Anthropocene: Conceptual and Historical Perspectives. *Philosophical Transactions of the Royal Society, A*. 369: 842-867. 2011
4. Tivy, Joy: *Biogeography: A Study of Plants in the Ecosphere,* Longman Scientific & Technical, U.K., 1993.

Pedagogy: There must be active interaction between teacher and students on different aspects of ecology and environment. Emphasis should be given to group reading, participatory learning, analysis of documentaries and discussions on complexity of key concepts and ideas of ecosystem approach to solve environmental problems with specific focus on India and local areas.

OR

OPTION (v): CONTEMPORARY ISSUES IN HUMAN GEOGRAPHY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: Main objective of the course is to provide an insight of social, political, economic and environmental issues emerged in the 21st century before the human societies and their social implications.

COURSE CONTENT

Unit-I

i. Human Geography: Changing nature or perspectives, issues and debates, critical understanding of social theory and human geography.
ii. Conceptualizing Space and Place: Structure and dynamics of space; relational framework of space and place; social construction of space and time; ethics of space and place.

Unit-II

iii. Geography of Difference and Exclusion: Geographies of identity and difference related to class, religion, caste, gender and location; social justice and political geography of difference.
iv. Geographical Organisation of Power: Spatial meaning and definitions of power; dynamics of spatio-social interactions and power; geopolitics of power-territoriality and globalization.

Unit-III

v. Geography of Development: Meaning, definitions and approaches; construction of development indicators; linking globalisation and new forms of development; local initiatives towards development.

Unit-IV

vi. Geography of social action and movements: Reasons and approaches to social movements; aspects of social security; social-environmental movements in India.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Agnew, J.A. and Corbridge, S.: *Mastering Space: Hegemony, Territory and International Political Economy,* Routledge, London, 1955.
2. Cloke, P., P. Crang and M. Goodwin.: *Introducing Human Geographies*, Routledge, London and New York, 2014.
3. Knox, P.L. and S.A. Marston.: *Human Geography: Places and Regions in Global Context,* Pearson, New Delhi, 2015.
4. Agnew, J.A. and J.S. Duncan.: *Human Geography*, Wiley Blackwell, U.K., 2016.
5. Benko, G. and Strohmayer, U.: *Space and Social Theory: Interpreting Modernity and Postmodernity*, Blackwell Publishers, Oxford, London, 1997.
6. Bhabha, H.: *The Location of Culture*, Routledge, London and New York, 1994.
7. Corbridge, S., Martin, R. and Thrift, N.: *Money, Power and Space*, Blackwell, Oxford, 1997.
8. Derek, G., Martin, R., and Smith, G.: *Human Geography: Society, Space and Social Science*, Macmillan Publishers, Cambridge, 1994.
9. Johnston, R.J.: *A Question of Place: Exploring the Practice of Human Geography*, Blackwell Publishers, Cambridge, 1991.

Further Readings:

1. Harvey, D.: *Justice, Nature and Geography of Difference*, Blackwell Publishers, Cambridge, 1996.
2. Massey, D.: *Space, Place and Gender*, Polity Press, Cambridge, 1998.
3. Massey, D., Allen, J., and Sarre, P.: *Human Geography Today*, Blackwell Publishers, Cambridge, 1999.
4. Morley, D. and Robins, K.: *Spaces of Identity: Global Media, Electronic Landscapes and Cultural Boundaries*, Routledge, London, 1995.
5. Redcliff, M., and Benton, T.: *Social Theory and Global Environment,* Routledge, London and New York, 1994.
6. Rogers, A. and Vertovec, S.*: The Urban Context*, Berg, Oxford, 1995.
7. Sack, R.D.: Homo Geographicus: *A Framework for Action, Awareness, and Moral Concern*, The John Hopkins University Press, London, 1997.
8. Sibley, D.: *Geographies of Exclusion: Society, and Difference in the West*, Routledge, London, 1995.
9. Werlen, B.: *Society, Action and Space: An Alternative Human Geography*, Routledge, London, 1993.

Pedagogy: Field visits should be organised to familiarize the students with changing space organization of economic, political and social activities and students should be encouraged to take up empirical exercises to understand patterns of distribution of poverty, consumerism and prosperity.

SEMESTER II

GEOG 201: CLIMATOLOGY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: To foster comprehensive understanding of atmospheric phenomena; their dynamics and global climates.

COURSE CONTENT

Unit -I

i. Climatology: History, development, subdivisions, importance.
ii. The earth's atmosphere: Composition and structure.
iii. Atmospheric energy and terrestrial radiation: Solar radiation; mechanisms of heat transfer (conduction, convection, radiation); distribution of solar radiation over the earth; global radiation budget.
iv. Temperature: Concept, measurement, scales, daily and annual cycles of temperature; vertical distribution; world distribution.

Unit -II

v. Atmospheric pressure and winds: Vertical variation of pressure; horizontal variation of pressure; forces affecting wind; pressure systems; surface winds
vi. Atmospheric moisture and precipitation: Concept and measurement of atmospheric moisture; forms of condensation; adiabatic temperature changes, hydrologic cycle; formation and types of precipitation; global distribution of precipitation.

Unit -III

vii. Air masses: Origin, classification and types of modification;
viii. Fronts: Types and characteristics, tropical and temperate cyclones;

Unit -IV

ix. Need for and criteria of classification of climates.
x. Classification of Climates with special reference to Koppen and Thornthwaite

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Barry, R.G. & Chorley, R.J.: *Atmosphere, Weather and Climate*, Methuen Co. Ltd., London, 5th Edition, 1987.
2. Barry, R.G. & Chorley, R.J.: *Atmosphere, Weather and Climate*, 9th Edition, Methuen Co. Ltd., London, 2009.
3. Bhutani, Smita: *Our Atmosphere*, Kalyani Publishers, Ludhiana, 2000.
4. Critchfield, H.J.: *General Climatology*, Prentice Hall, N.J., 1975.

5. Frederick K. Lutgens & Edward J. Tarbuck: *The Atmosphere: An Introduction to Meteorology*, Prentice Hall of India Pvt. Ltd., New Delhi, 2012.
6. Lal, D.S., *Climatology*, Sharda Pustak Bhaban, Allahabad, 2009.
7. Strahler, A.N.: *Modern Physical Geography*, John Wiley and Sons, New York, Singapore, 1987.
8. Strahler, A. and A. Strahler: *Introducing Physical Geography*, 6th Edition, John Wiley & Sons, Hoboken, New Jersey, 2013.
9. Strahler, A. and A. Strahler: *Physical Geography: Science and Systems of Human Environment*. 3rd Edition, John Wiley, Hoboken, New Jersey, 2005.
10. Trewartha, G.T.: *An Introduction to Climate*, McGraw Hill, New York, 1980, Fifth Edition (International Student Edition).
11. Trewartha: *Introduction to Climate*, 5th Edition, McGraw Hill, Auckland, 1980.

Further Readings

1. Arthurn: *Introductory Physical Geography*, 4th Edition, John Wiley, Hoboken, 2006.
2. Arthurnm, Physical Geography: Science and System of Human Environment. 3rd Edition, John Wiley, Hoboken, 2005.
3. Lydolph, P.E.: *The Climate of the Earth*, Rowman Nad Allanheld, Totowa, New Jersey, 1985.
4. Rumney, G.R.: *Climatology and the World Climates*, Macmillan, London, 1968.
5. Thompson R.D.: *Applied Climatology - Principles & Practice*, John Wiley, New York, 1997.
6. Ahrens, C. D. and Henson, R.: Meteorology Today: An Introduction to Weather, Climate and the Environment, 12th Edition, Cengage Learning, USA, 2018.
7. Schneider, S. H., Root, T. L., and Mastrandrea, M. D. (eds.): *Encyclopedia of Climate and Weather,* 2nd Edition*,* Oxford University Press, New York, 2011.
8. Lamb, H. H.: *Climate, History and the Modern World*, 2nd Edition, Routledge, New York, 1997.
9. Robinson, P. J. and Henderson- Sellers, A.: *Contemporary climatology*, 2nd edition, Pearson Education Ltd., Harlow, UK, 1999**.**
10. Rohli, R. V. and Vega, A. J.: *Climatology*, 3rd Edition, Jones and Bartlett Learnings, Burlington, 2015.

Pedagogy: If possible, audio - visual aids will be arranged to explain weather phenomena to the students. Visits for the students to the nearest Weather Observatory and Meteorological Department will be arranged to know the functioning of various weather instruments and to understand weather conditions with the help of Weather and Climate Charts.

GEOG 202: GEOGRAPHY OF INDIA (SYSTEMATIC AND REGIONAL)

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: To provide an understanding of:

- The geographic dimensions of India in terms of its political and administrative characteristics.
- The physical and climatic attributes and their interface with developmental strategies.
- The human and economic dimensions of India in a spatial perspective.

COURSE CONTENT

Unit-I

i. Unity in diversity of India: Unifying mechanism and divisive streaks.
ii. Evolution of the administrative map of India since Independence.

Unit-II

iii. Role of language, religion and culture in the formation of regions.
iv. The question of regional disparity and identity in India.

Unit-III

v. Regionalisation schemes of India: Physiographic (SP Chatterjee), Climatic (Koeppen and Trewartha), Agricultural (Jasbir Singh and CB. Mamoria), and Industrial (BN Sinha).

Unit-IV

Northwest India:

vi. Northwest India as a Geographic Entity: Jammu & Kashmir, Himachal Pradesh, Haryana, Punjab and Union Territories of Delhi and Chandigarh.
vii. Land: Physiography and drainage.
viii. People: Population number, distribution and density, growth and urbanization.
ix. Economy: Agriculture, Industry and Transport.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Ahmad Aijazuddin: *Social Geography*, Rawat Publication, New Delhi, 1999.
2. Chandna, R.C.: *Geography of Population*, Kalyani Publishers, Delhi, 1998.
3. Deshpande, C.D.: *India- A Regional Interpretation*, ICSSR & Northern Book Center, Delhi, 1992.
4. Gautam, A.: *Advanced Geography of India*, Sharda Pustak Bhawan, Allahabad, 2009.
5. Hussain, M.: *Geography of India*, Tata McGraw Hill Pub. Company Ltd., New Delhi, 2008.
6. Govt. of India: *India, A Reference Annual*: Ministry of Info. & Broadcasting, New Delhi, 2018.
7. Krishan, G.: *The Vitality of India: A Regional Perspective*, Rawat Publications, 2017
8. Muthiah, S.: *A Social and Economic Atlas of India*, Oxford University Press, Delhi, 1987.
9. Singh, J.: *India-A Comprehensive Systematic Geography*, Gyanodya Prakashan, Gorakhpur, 2003.
10. Spate O.H.K. & A.T.A. Learmonth: *Geography of India and Pakistan*, Methuen, London (First Indian Edition,1984, Munshiram Manoharlal, New Delhi), 1967.
11. Sukhwal, B. L.: *India: A Political Geography*, Allied Publishers, New Delhi.
12. Tirtha, Ranjit: *Emerging India*, Conpub. Ann Arbour, U.S.A. Michigan, 2006.
13. Tiwari, R.C.: *Geography of India*, Prayag Publishers, Allahabad, 1999.
14. Wadia, D. N.: *Geology of India*, Macmillan & Co., London, 1953.

Further Readings:

1. Center for Science and Environment: *State of India's Environment*, New Delhi, 1985.
2. Desai, B. Sonalde et al: *Human Development in India*, Oxford Univ. Press, New Delhi, 2010.
3. Dreze, Jean and Amartya Sen: *Indian Development*, Oxford University Press, Delhi, 1996.
4. Farmer, B. H.: *Introduction to South Asia*, Methuen, London, 1983.
5. Francis, Robinson: *The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan, and the Maldives*, Cambridge University Press, London, 1989.
6. Gazetteer of India, Vol. I & II: *Ministry of Information & Broadcasting*, GOI, New Delhi, 1973.
7. Johnson, B.L.C: *India: Resources and Development*, Arnold Heinemann, London, 1980.
8. Singh, K.S.: *People of India*, Anthropological Survey of India, Dehradun, 1992.
9. Sivaramkrishnan, K.C., Amitabh Kundu and B.N. Singh: *Oxford Handbook of Urbanisation in India,* Oxford University Press, New Delhi, 2007.

Pedagogy: The course should be backed up with extensive use of examples from India.

GEOG 203: FUNDAMENTALS OF REMOTE SENSING
(Theory and Practical)

Max. Marks: 100
Theory paper: 50 Marks
Practical Record and Viva Voce (20+10): 30 Marks
Internal Assessment: 20 Marks

Objectives:

- To expose the students to geospatial technology and develop their skills of interpretation and map making using remote sensing.
- To introduce the students to the application of this new technology in solving various problems related to the management and planning of resources.

COURSE CONTENT

Unit-I

Fundamental Concepts of Remote Sensing:

i. Remote Sensing: Concept, Types and Applications
ii. Remote Sensing Platforms, Sensors and Scanning Systems
iii. Major Satellite Systems

Unit-II

EMR Principles and Interaction Mechanisms:

iv. Radiation Principles; Electromagnetic Spectrum
v. Energy-Atmosphere Interaction; Atmospheric Windows
vi. Energy-Earth Interaction; Spectral Signatures of Surface Features

Unit-III

Understanding Satellite Imageries:

vii. Image: Meaning and Types and Characteristics
viii. Resolution: Spatial, Spectral, Radiometric and Temporal
ix. Thermal and Microwave Remote Sensing

Unit-IV

Image Interpretation and Processing:

x. Elements of Image Interpretation
xi. Basics of Image Processing: Pre-processing and Enhancement Techniques
xii. Image Classification Techniques and Analysis

Practical (30 Marks):

1. Measuring Orbital velocity, Orbital Period and Orbital Height of satellites
2. Introduction to Energy Wavelength, Frequency and Spectrum
3. Calculation of EMR Frequency, Wavelength, Energy and Radiant Exitance
4. Analysis of Spectral Signatures of Surface Features
5. Visual Interpretation of Features from Satellite Imagery
6. Georeferencing Satellite Image
7. Preparing Image Subset, Mosaic, Layer stacking and Resolution merge
8. Digital Image Interpretation: Band Combination, Histogram and Pixel Values
9. Digital Image Classification-I: Supervised Classification
10. Digital Image Classification-II: Unsupervised Classification

Note

1. A compulsory question containing 10 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 7 questions in about 25-30 words each. Each question shall carry 2 marks (total 14 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit carrying 9 marks (total 36 marks). These will be in addition to the compulsory question at serial number 1.

3. Each candidate shall prepare a Practical under the supervision and guidance of the teacher concerned. The candidate shall submit his Practical File at least 10 days before the commencement of the theory examination to the concerned department duly approved and signed by the faculty member teaching the course.
4. Assessment of practical record and viva voce on it will be done by a Board of Examiners, consisting of one external examiner and one internal examiner, as practical examinations.
5. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.

LIST OF READINGS

Essential Readings:

1. Campbell, J. B. and R.H. Wynne: *Introduction to Remote Sensing,* 5th Ed., Guilford Press, 2012.
2. Gomarasca, Mario A, *Basics of Geomatics*, Springer: Heidelberg, 2009.
3. Joseph, G.: *Fundamentals of Remote Sensing*, Universities Press, 2005.
4. Rees, W.G.: *Physical Principles of Remote Sensing,* 3rd Ed., Cambridge University Press, 2012.
5. Schowengerdt, Robert A.: *Remote Sensing: Models and Methods for Image Processing*, Second Edition, Academic Press: San Diego, 2017.
6. Srivastava, G.S.: *An Introduction to Geoinformatics*, McGraw Hill Edu., India, New Delhi, 2014.
7. Dong, P and Qi Chen: *LiDAR Remote Sensing and Applications*, CRC Press, Taylor & Francis, Boca Raton, 2018

Further Readings:

1. Jensen, J.R.: *Introductory Digital Image Processing: A Remote Sensing Perspective*, Pearson Prentice Hall, 2005.
2. Lillesand, T.M., R.W. Kiefer and J.W. Chipman: *Remote Sensing and Image Interpretation*, 5th Edition, John Wiley and Sons, 2004.
3. Mather, P.M. and M.G. Koch: *Computer Processing of Remotely-Sensed Images: An Introduction,* John Wiley & Sons, 2011.
4. Nag, P. and M. Kudrat: *Digital Remote Sensing*, Concept Publishing Company, New Delhi, 1998.
5. Njoku, E.G.: *Encyclopaedia of Remote Sensing*, Springer, New York, 2014
6. Richards, John A.: *Remote Sensing Digital Image Analysis: An Introduction,* 5th Edition, Springer-Verlag Berlin Heidelberg, 2013.

Pedagogy: Students shall be exposed to latest developments in the field of remote sensing through focused hands-on-training and practical exercises in the laboratory. They may be taken to field for verification of identifiable features on satellite imageries. Remote Sensing professionals may be invited to interact and deliver special lectures to students on remote sensing techniques.

GEOG 204: ANY ONE OF THE FOLLOWING OPTIONAL COURSES
OPTION (i): CULTURAL GEOGRAPHY

Max. Marks: 100
Terminal Exam : 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To introduce Cultural Geography as a relevant and fertile sub-discipline within Geography.
- To introduce the conceptual and philosophical elements of cultural geography.
- To foster a comprehensive understanding of culture as a concept in Geography

COURSE CONTENT

Unit-I

Introduction to Cultural Geography

i. Cultural Geography: Definition, Evolution and Development
ii. Place of Cultural Geography within Geography
iii. Doing Cultural Geography: Philosophical Bases and Methodologies

Unit-II

Concepts in Cultural Geography

iv. Cultural Hearth, Cultural Region, Landscape, Environment
v. Nature/Human; Space/Place; Regionalism, Homeland
vi. Identity & Difference; Power & Discourse; Hegemony

Unit-III

Processes in Cultural Geography

vii. Landscape Evolution; Cultural Diffusion; Adaptation
viii. Acculturation, Assimilation; Resistance
ix. Representation; Construction; Socio-spatial Dialectic

Unit-IV

Cultural Manifestations

x. Transforming Landscapes
xi. Our Unequal World
xii. The Production of Knowledge and Representation in Cultural Geography

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Anderson, Jon: *Understanding Cultural Geography Places and Traces,* London: Routledge, 2010.
2. Anderson, K. Domosh, M., Pile, S. & Thrift, N. (eds.): *Handbook of Cultural Geography,* London: Sage Publications, 2003.
3. Anderson, K. & Gale, F. (eds.): *Cultural Geographies,* 2nd edition, Melbourne: Longman 1999.
4. Appadurai, A.: *Modernity at Large: Cultural Dimensions of Globalisation,* University of Minnesota Press, Minneapolis, 1996.
5. Bertolas, R. J. (1998): Cross-cultural environmental perception of wilderness. *Professional Geographer,* 50(1), pp 98-111.
6. Cosgrove, D. & Jackson, P. (1987): New directions in cultural geography. *Area,* 19(2), pp 95-101
7. Norton, W. and Walton-Roberts, M.: *Cultural Geography: Environments, Landscapes, Identities, Inequalities*. Ontario: Oxford University Press, 2014.
8. Price, M. & Lewis, M. (1993): The reinvention of cultural geography. *Annals of the Association of American Geographers,* 83 (1), pp1-17.
9. Shurmer-Smith, P (ed.). *Doing Cultural Geography*, Sage, New Delhi, 2003.

Further Readings:

1. Oakes, T.S. and Price, P.L (eds.).: *The Cultural Geography Reader*, Routledge, London and New York, 2013.
2. Massey, D.: *Space, Place and Gender*. Cambridge: Polity Press, 1994
3. Mitchell, D.: *Cultural Geography: A Critical Introduction.* Malden: Blackwell, 2000
4. Ralph, E.: *Place and Placelessness*. London: Pion, 1976
5. Sauer, C.: *The Morphology of Landscape*. Berkeley: University of California Press, 1925

6. Sauer, C.: *Agricultural Origins and Dispersals: The Domestication of Animals and Foodstuffs*. Cambridge, MA: MIT Press, 1969
7. Shields, R.: *Places on the Margin: Alternative Geographies of Modernity*. London and New York: Routledge, 1991
8. Spivak, G. C.: *The Post-colonial Critic: Interviews, Strategies, Dialogues*. London and New York: Routledge, 1990

Pedagogy: The course shall be illustrated with extensive examples from India and the rest of the world. Relevant audio-visual aids shall be used, and depending upon feasibility, field trips shall be organized.

OR

OPTION (ii): POPULATION AND DEVELOPMENT PLANNING

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: The objective of this course is to promote awareness on the interactive relationship between population and development. This relationship between population and development planning is applicable only on the national scale and not at intra-national level. It is more relevant for less developed countries as a large gap exists between the rate of population growth and rate of economic development. In less developed countries high population growth is seen as the chief obstacle to the development process. The course tries to recommend strategies for integrated population and development wherever relevant.

COURSE CONTENTS

Unit-I

i. Population and development planning.
ii. Population and Sustainable Development Goals.

Unit-II

iii. Population growth in the context of:
    a. Manpower and employment.
    b. Educational planning.
    c. Housing needs.
    d. Health and family planning.

Unit-III

iv. Population distribution, migration and development.
v. Population and environment.

Unit-IV

vi. Development problems of more developed countries (Economic, Physical, Environmental, Population, Social and Health).
vii. Population and development (case studies of Japan, Brazil and India).

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of eight questions will be set out of the whole syllabus, at least two from each unit. The candidates will attempt four questions selecting one from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.

4. For reappear/improvement candidate(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Allen, J.L.: *Environment*, The Dishkin Publishing Group, Inc. Connecticut, U.S.A., 1992.
2. Cassen, R.: *Population and Development: Old Debates New Conclusions*, US Third World Policy Perspectives: No. 19, Overseas Development Council, Washington DC, 1994.
3. Courteny, P.P. (ed.): *Geographical Studies of Development*, Longman, United Kingdom.
4. Cunningham, W.P. and Saigo, B.W.: *Environmental Science: A Global Concern*, W.M.C. Brown Publishers, U.S.A., 1992.
5. Davis, K. and Bernstam, M.S. (ed.): *Resources Environment and Population: Present Knowledge*, Future Options, The Population Council, New York, 1991.
6. De Souza, A.R.: *A Geography of World Economy*, Merrill Publishing Co., London, 1990. 8. East-West Centre, Asia-Pacific Population and Policy, January 2003, No. 64, Honolulu, USA, 2003.
7. Dyson, T.: *Population and Development: The Demographic Transition*, Rawat Publications, Jaipur, 2011.
8. Findlay, A.M. and Findlay, A.: *Population and Development in the Third World*, Routledge, New York, 1987.
9. Gould, W.T.S.: *Population and Development*, 2nd ed., Routledge, Taylor & Francis Group, London, 2015.
10. Hawthorn, G.: *Population and Development: High and Low Fertility in Poorer Countries*, Routledge, New York, 2011.
11. Lester, R.B.: *State of the World, World Watch Institute Report on Progress Toward a Sustainable Society*, W.W. Norton and Company, New York, 1988.
12. Pampel, F.C.: *The Institutional Context of Population Change: Patterns of Fertility and Mortality across High-Income Nations*, The University of Chicago Press, 2001.
13. Petit, V.: *Population Studies and Development from Theory to Fieldwork*, Springer International Publishing, 2018.
14. Robinson, W.C.: *Population and Development Planning*, The Population Council, New York, 1975.
15. Sharma, A.K.: *Gandhian Perspective on Population and Development*, Concept Publishing House, New Delhi, 1996.
16. Shiva Kumar, A.K., Panda, P. and Ved, R.R.: *Handbook of Population and Development in India*, Oxford University Press, India, 2010.
17. Singh, K.N. and Singh, D.N.: *Population Growth, Environment and Development: Issues, Impacts and Responses*, Environment and Development Study Centre, Varanasi, 1991.

Further Readings:

1. UNESCAP: *Population and Development Indicators for Asia and the Pacific*, 2011, http://www.unescap.org/sdd/publications/datasheet-2011/Datasheet-2011-p2.pdf
2. UNO: *Population and Development Integration*, *Vol. I: ESCAP Regional Perspectives*, Asian Population Studies Series No. 92, ESCAP Bangkok, 1988.
3. UNO: *Population and Development Integration, Vol. II: ESCAP Regional Perspectives*, Asian Population Studies Series No. 92, ESCAP Bangkok, 1989.
4. UNO: *Population and Development Selected Issues, Population and Poverty in Asia and Pacific*, Asian Population Studies Series No. 161, ESCAP Bangkok, 2003.
5. World Development Report: *Poverty*, World Bank, Oxford University Press, New York, 1990.

Pedagogy: The students should be explained the interactive relationship between the change in different attributes of population and development. The platform from which we see this relationship remains population. In this course, we are not concerned with the mechanics of development planning. Illustrations should be used from the latest articles on the subject appearing in geographic journals and newspapers.

OR

Option (iii): FUNDAMENTALS OF NATURAL HAZARDS AND DISASTER MANAGEMENT

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To introduce students with the idea of natural hazards and disaster management.
- To make them aware about forms, mechanisms and processes of some key natural hazards
- To introduce the concepts of disaster vulnerability, risk reduction and resilience

COURSE CONTENT

Unit-I

Introduction to Hazards & Disasters

i. Evolution of Disaster Studies and its Current Status
ii. Basic Concepts: Hazard, Vulnerability, Disaster Risk, Resilience
iii. Classification and Types of Hazards/Disasters

Unit-II

Hazard Mechanisms and Processes

iv. Earthquake and Landslide Hazards
v. Avalanche and Floods/Flashfloods
vi. Cyclone and associated Hazards

Unit-III

Hazards and Disasters in India

vii. Regional Dimension of Hazards/Disasters in India.
viii. Floods, Drought and Desertification in India
ix. Disasters in Himachal Pradesh

Unit-IV

Disaster Management Mechanism

x. Disaster Management: Concept and Activities
xi. Disaster Management Mechanism in India
xii. Disaster Management Policies

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Wisner, B.; Blaikie, P.: Terry Cannon and Ian Davis. *At Risk: Natural Hazards, People's Vulnerability, and Disasters, Second Edition,* Routledge, London, 2014.
2. Birkmann, J.: *Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies*. US: United Nations University Press, 2006.

3. Coppola, Damon P.: *Introduction to International Disaster Management*. Third Edition, Elsevier, London, 2015.
4. Government of India: *National Policy on Disaster Management*. National Disaster Management Authority, Ministry of Home Affairs, New Delhi, 2009.
5. Gupta, M.C.; L.C. Gupta, B.K. Tamini, Vinod K. Sharma: *Manual on Natural Disaster Management in India,* National *Disaster Management Centre, New Delhi, 2000.*
6. Hyndman, D. and D. Hyndman: *Natural Hazards and Disasters*. Fifth Edition, Cengage Learning, USA, 2016.
7. Madu, Christian N and Chu-hua Kuei: *Handbook of Disaster Risk Reduction and Management*. World Scientific Publishing Co. Pte. Ltd, Singapore, 2018.

Further Readings

1. Alexander, D. E.: *Natural Disasters*. London: University College London Press and; Dordrecht and Boston: Kluwer Academic Publishers, 1993.
2. Alexander, D. E.: *Confronting Catastrophe: New Perspectives on Natural Disasters*. Harpenden, U.K: Terra Publishing, 2000.
3. Burton, I., Kates, R.W. and White, G.F.: *Environment as Hazard*, 2nd edition, Guilford Press, New York, 1993.
4. Hewitt, K.: *Regions of Risk: A Geographical Introduction to Disasters*, Longman, London, 1997.
5. Kasperson, J.X., Kasperson, R.E. and Turner, B. L.: *Regions at Risk: Comparisons of Threatened Environments, United Nation* University Press, Tokyo, 1995.
6. Schneider, S.K.: *Flirting with Disaster: Public Management in Crisis Situations*, M.E. Sharpe, New York, 1995.
7. Subramanian, R.: *Disaster Management*, Vikas Publishing House Pvt. Ltd., Noida, India, 2018.

Pedagogy: There must be interaction between teacher and students on different aspects of natural hazards and disasters with the help of movies/documentaries, pictures and case studies. The emphasis will be given on group discussion and activities to promote learning on different facets of disaster risk, resilience and management.

OR

OPTION (iv): MARKETING GEOGRAPHY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: Main objective of the course is to provide an insight into the marketing systems, their development, classification and relevance in the context of regional development.

COURSE CONTENT

Unit-I

i. Nature and scope of Geography of Marketing.
ii. Approaches: Functional, morphological, cultural-historical and spatial.

Unit-II

iii. Development of marketing systems.
iv. Classification of Markets: Rural, urban and intra-urban.
v. Periodic Markets: Periodicity, locational and distributional patterns, fair as a market place.

Unit-III

vi. Analysis of hinterlands, market size and hinterland relationships; modes and patterns of consumer and trader travels, consumer behavior, functional hierarchy of markets; functional interaction between markets.

Unit-IV

vii. Geographic study of markets in India, Ghana, Kenya and Germany.
viii. Role of market centres in regional development.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Barnum, G.: *Market Centres and Hinterlands in Baden-Wurrttemberg*, Chicago, Chicago University Press, 1968.
2. Berry, B.J.L.: *Geography of Market Centres and Retail Distribution*, Englewood Cliffs, Prentice Hall, 1967.
3. Good, C.M.: *Rural Markets and Trade in East Africa*, Chicago University Press, 1970.
4. N.C.A.E.R.: *Markets, Towns and Spatial Development in India*, New Delhi, 1965.
5. Saxena, H.M.: *Geography of Transport and Market Centres*, S. Chand & Co., New Delhi, 1975.
6. Saxena, H.M.: *Marketing Geography*, Rawat Publications, 1990.
7. Thompson, Grahame; Frances Jennifer; Levacic Rosalind & Jeremy Mitchell: *Markets, Hierarchies and Networks*, Sage Publications, 1994.

Further Readings:

1. Christaller, W.: *Central Places in Southern Germany*, Englewood Cliffs, Prentice Hall, 1966.
2. Hodder, B.W.: *Markets in West Africa*, Ibadan, Ibadan University Press, 1969.
3. Saxena, H.M.: *Rural Markets and Development*, Rawat Publications, 1988.

Pedagogy: Field visits should be organised to familiarize the students with markets in India and students should be encouraged to take up empirical exercises to examine patterns of distribution of markets in India.

OR

OPTION (v): GEOGRAPHY OF WATER RESOURCES

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: This course aims at developing awareness in students about the finite nature of water resources; declining per capita availability of quality water; escalating demands and the looming water crisis. It will help them to understand the need for better management of water resources through appropriate methods and conservation of water resources.

COURSE CONTENT

Unit-I

i. Water as a focus of geographical interest, inventory and distribution of world's water resources (surface and sub-surface).
ii. The basic hydrologic cycle; Precipitation, potential evapotranspiration and interception losses; run off.

Unit-II

iii. Water demand and use in (a) Agriculture (b) Industry (c) Navigation (d) Power Generation (e) Recreation, and (f) Household.

iv. Conservation Practices and planning for the development of water resources.

Unit-III

v. Problems of water resource management in India (i) water logging (ii) ground water (iii) water pollution (iv) flood (v) drought.

vi. International and Interstate River water disputes and treaties with reference to India.

Unit-IV

vii. Integrated basin planning: Concept, Need, Projects of Inter-Basin Water Transfer.

viii. Watershed management: a) Land and Water Conservation Through Watershed Development (b) Land and Water Management through Biotic Control. Implementation of Watershed Development Programmes and hindrances.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Agarwal, Anil and Sunita Narain: *Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System*, Centre for Science and Environment, New Delhi, 1997.
2. Barlow, M. and Clarke, T.: *Blue Gold: The Fight to Stop the Corporate Theft of the World's Water*, Leftword Books India, 2003.
3. Bournaris, Thomas: *Economics of Water Management In Agriculture,* CRC Press, 2014
4. Economic and Social Commission for Asia Pacific, United Nations*: Guidelines for the preparation of National Master Water Plans*, 1989.
5. Frost, Helen: *The Water Cycle,* Capstone Press, 2000
6. Haines Daniel: *Indus Divided: India, Pakistan and the River Basin Dispute, Penguin, 2017*
7. Jones, J.A.: *Global Hydrology: Processes, Resources and Environmental Management*, Longman, 1997.
8. Matter, J.R.: *Water Resource Distribution, Use, Management*, John Wiley, Marylane, 1984.
9. Murthy, J.V.S.: *Watershed Management,* New Age Publishers, Delhi, 2017
10. Nath, T S: *Irrigation and Interlinking of Indian Rivers,* Daya Publishing House, 2013
11. Ram Kumar Gurjar and B.C. Jat: *Geography of Water Resources*, Rawat Pub., Jaipur, 2008.
12. Scott M. Moore: *Subnational hydropolitics: conflict, cooperation and institution-building in shared river basins*, Oxford University Press, 2018.

Further Readings:

1. Michael, A.M.: *Irrigation: Theory and Practices*, Vikas Publishing House Pvt. Ltd., New Delhi, 1978.
2. Rao, K.L.: *India's Water Wealth*, Orient Longman, New Delhi, 1979.
3. Kates, R.W. and Burton, I. (ed.): *Geography, Resources and Environment*, Ottowa, 1980.
4. Sidharth, K.: *Oceanography: A Brief Introduction*, Kisalaya Publications, New Delhi, 2000.
5. Smith, K.: *Water in Britain: A Study in Applied Hydrology and Resource Geography*, McMillan, London, 1972.

6. Tebbutt, T.H.Y. (ed.): *Advance in Water Engineering*, Elsevier Applied Science Pub., London, 1985.
7. Tideman, E.M.: *Watershed Management: Guidelines for Indian Conditions*, Omega, New Delhi, 1996.
8. Verghese, B.G.: *Water of Hope: Integrated Water Resource Development and Regional Co-operation within the Himalayan-Ganga-Brahmaputra-Barak Basin*, Oxford.

Pedagogy: The students should be made to understand the importance of efficient use of water and the practices to conserve it. Also, they must be encouraged to visit countryside to understand traditional water harvesting practices and their relevance to current scenario.

OR

OPTION (vii): ADMINISTRATIVE GEOGRAPHY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objective: To enable the students to understand the role of Geography in area administration. It also helps them to appreciate the role of public policy and finance in development of administrative areas.

COURSE CONTENT

Unit-I

i. Administrative Geography; Definition, subject matter and significance: Interface between Geography and Public Administration and Political Geography.

Unit-II

ii. Study of administrative areas in terms of (a) Evolution, (b) Nature, (c) Structural Attributes (hierarchy, size, shape and headquarters) and (d) Administrative area reform.

Unit-III

iii. Area Administration: (a) Public Policy: Formulation, Implementation and Impact, (b) Public Finance: Public goods and public economy.

Unit-IV

iv. Administrative System: (a) The world pattern, (b) Case studies: India and U.S.A.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Alderfer, H.F.: *Local Government in Developing Countries*, McGraw Hill, New York, 1964.
2. Bennett, R.J.: *Geography of Public Finance*, Methuen, New York, 1980.
3. Coppock, J.T. and JRD Sewell (ed.): *Spatial Dimension in Public Policy*, Pergamon Press, Oxford, 1976.

4. Dorling, D., & Shaw, M.: *Geographies of the agenda: public policy, the discipline and its (re) 'turns*', Progress in Human Geography, 26(5), pp 629-641, 2002.
5. Fesler, J.W.: *Area and Administration*, University of Alabama Press, Alabama, 1949.
6. Humes, S. and Martin, E. M.: *The Structure of Local Government throughout the World*, Martines Nijhoff, The Hague, 1961.
7. Kant, Surya: *Administrative Geography of India*, Rawat Publication, Jaipur, 1988.
8. Krishan, Gopal: *Administrative Geography*, Transaction of the Institute of Indian Geographers, Vol. 5, No. 2, pp 101-108, 1983.
9. Krishan, Gopal: *The World Pattern of Administrative Area Reform*, The Geographical Journal, Vol. 154, No. 1, pp 93-99, 1988.
10. Martin, R.: *Geography and public policy: the case of the missing agenda,* Progress in Human Geography, 25(2), pp 189-210, 2001.
11. Singh, M. P.*: Reorganization of States in India,* Economic and Political Weekly, pp 70-75, March 15, 2008.
12. Surya Kant: *Organisation of space for administration: Presidential Address*, Transaction Institute of Indian Geographers, Vol.39 (2), pp 163-169, July 2017.
13. Surya Kant and Nina Singh (*eds)*: *Geography, Development, Public Policy: Select Essays of Gopal Krishan,* R.K. Books, New Delhi, 2017.
14. Ward, K.: *Geography and public policy: A Recent history of Policy Relevance,* Progress in Human Geography, 29(3), pp 310-319, 2005.

Further Readings:

1. Massam, B. H.: *The Spatial Structure of Administrative Systems*, Association of American Geographers, Research Paper No. 12, 1972.
2. Muir, R.: *Modern Political Geography*, Macmillian, London, 1981.
3. Pounds, N.J.G.: *Political Geography*, 2nd Edition, McGraw Hill, New York, 1972.
4. Prescott, J.R.V.: *The Geography of the State Policies*, Hutchinson, London, 1968.

Pedagogy: The students should be made to understand administrative areas and area administration and underlying philosophy involved in formation of spatial units and formulation of public policies.

SEMESTER III

GEOG 301: TOWN AND COUNTRY PLANNING

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: The major objective of this paper is to highlight the role of geographic concepts and methods in settlement planning at the micro level. Divided into four units, it deals with conceptual and methodological issues, planning strategies, and case studies.

COURSE CONTENT

Unit-I

i. Human Settlement: A brief history with its relevance in modern context.
ii. Settlement System: Types and Functions.
iii. Town and Country Planning Practice in India.

Unit-II

iv. Town Planning: Definition, nature, importance and scope.
v. Preparation of town plan: Statement of objectives, surveys and data collection for town planning with special reference to urban land surveys, formulation of policies, zoning, locational and space
vi. Requirements for residential, work, and play areas.
vii. Planning of transport and public utilities.
viii. Problems of town planning in India.
ix. Urban planning policies in Indian Five-Year Plans.
x. Indian town planning experiences - Master Plan of Delhi and Chandigarh.

Unit-III

xi. Country Planning: Definition, nature, importance and scope.
xii. Rural Landuse and its determinants.
xiii. Rural Landuse, land suitability, and soil surveys.

Unit-IV

xiv. Rural development in India during Five Year Plans.
xv. Planning for the following problems of rural India:
   a. Drinking water
   b. Floods and Soils
   c. Public utility services
   d. Poverty and employment.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Benjamin N.: *Cities made of boundaries: mapping social life in urban form*, London: UCL Press, 2018.
2. Bhardwaj, R.K.: *Urban Development in India*, National Book Trust, New Delhi, 1974.
3. Chapin, F.S. & Kaiser E.J., Urban Landuse Planning, Harper Bros., New York, 3rd Ed., 1985.
4. Hiraskar, G.K.: *Fundamentals of Town Planning*, Dhanpat rai publications, 2018
5. Jackson, J., *Surveys for Town and Country Planning*, Hutchinson Univ. Library, London, 1966.
6. Modak, V.N. and V.N. Ambedkar, *Town and Country Planning and Housing*, Oriental Longman, New Delhi, 1971.
7. TCPO, *Regional Planning Efforts in India*, Government of India, New Delhi, 1985.

Further Readings:

1. Govt. of India, *Report of the National Commission on Urbanisation, Vols. I & II*, Ministry of Urban Development, New Delhi, 1988.
2. Govt. of India, *Plan Drafts of Different Five-Year Plans*, Planning Commission, New Delhi.

Pedagogy: Distribution of a brief synopsis among students, prior to discussions in the class, on each topic, involving students in teaching and question-answer session at the end of each lecture will form the core of approach to class teaching. Listing on the black board the main headings of the theme to be discussed and the use of audio-visual aids, such as maps, transparencies and slides will be the guiding principle of teaching methodology. Organizing occasional field visits and inviting professionals as a guest faculty will be used to create bridges between the theory and practice of urban and regional planning

GEOG 302: RESEARCH METHODOLOGY IN GEOGRAPHY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: This paper is to familiarise the students with basics of research and its significance. It aims to make them understand the ways data are collected, classified, tabulated and analysed. It also trains them to differentiate between casual and research-based statements that help them in their life.

COURSE CONTENT

Unit-I

i. Meaning and objectives of research; research types; significance of research; research process.
ii. Research problem: Selection and techniques.

Unit-II

iii. Research Design, meaning, need and features of a good design.
iv. Measurements in research, scales; techniques of developing measurement tools.

Unit-III

v. Data collection, Methods, Preparation of questionnaires and schedules.
vi. Surveys and experiments.

Unit-IV

vii. Processing and Analysis of data, statistics in research.
viii. Hypotheses Formulation & Testing.
ix. Interpretation and Report Writing.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).

2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Creswell, John W., *Research Design; Qualitative, Quantitative and Mixed Methods Approach*, SAGE Publications, Los Angeles, 2008.
2. Flick, U. *An Introduction to Qualitative Research*, 5th Edition, SAGE, 2014.
3. Hagget, Peter and Others, *Locational Analysis in Human Geography*, Arnold, London, 1977.
4. Harvey, David, *Explanation in Geography*, Arnold, 1969.
5. Kothari, C.R., *Research Methodology*, Wiley Eastern Limited, New Delhi, 1988.
6. Kothari, C. R., *Research Methodology, Methods & Techniques,* New Age International Publisher, N. Delhi, 2008.
7. Krishan, G., and Singh, N. *Researching Geography: The Indian Context*. Routledge India, 2016.
8. Kumar Ranjit, *Research Methodology: A step-by-step Guide for Beginners*, SAGE Publications, Ltd. London (Third Edition), 2010.

Further Readings:

1. Bennet P. Lientz and Kathryn P.**,** *Project Management for the 21st Century*, Academic Press, California, 1995.
2. Earickson, R., and Harlin, J., *Geographic Measurement & Quantitative Analysis*, Macmillan, New York, 1994.
3. Ralph, Berry, *The Research Project, How to Write it*, Routledge, London, 1990.
4. Montello, D. and P. Sutton, *An Introduction to Scientific Research Methods in Geography and Environmental Studies*, SAGE, 2012
5. Thomas, S. Kuhn, *The Structure of Scientific Revolution*, Univ. of Chicago Press, Chicago, 1970.
6. Misra, H.N. and V.P. Singh, *Research Methodology in Geography*, Rawat Pub., Jaipur, 1998.
7. Misra, R.P., *Research Methodology*, Concept Publishing Company, New Delhi, 1989.

Pedagogy: Students are expected to identify a small research problem. They may be asked to prepare a research proposal for the same.

GEOG 303: FUNDAMENTALS OF GIS AND GPS
(Theory and Practical)

Max. Marks: 100
Theory Paper: 50 Marks
Practical Record and Viva Voce (20+10): 30 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: The main objective of this course is to expose the students to fundamental principles of Geographical Information Systems and Global Positioning System including basic concepts and definitions, methods and techniques.

COURSE CONTENT

Unit-I

i. Introduction: Overview, History of GIS, Scope and Application Areas, Components and Functional Elements of GIS.

ii. Map Concept: Map Scales and Representation.
iii. Map Projection: Coordinate system, Datum, Projection Systems and UTM.

Unit-II

iv. Nature of Geographical Data: Spatial and Attribute. Vector and Raster Based Models
v. Data Input Devices: Digitization and External Databases
vi. Storage and Manipulation of GIS Databases

Unit-III

vii. GNSS: Introduction, Concept, Components, Signals
viii. GNSS Accuracy and Errors
ix. GNSS Applications

Unit-IV

x. Cartography and Map Production: Map Symbology
xi. Presentation of GIS Output: Layout of Maps

Note

1. A compulsory question containing 10 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 7 parts in about 25-30 words each. Each part shall carry 2 marks (total 14 marks).
2. A total of eight questions will be set out of the whole syllabus, at least *two* from each unit. The candidates will attempt ***four*** questions selecting one from each unit carrying nine marks each. These will be in addition to the compulsory question at serial number 1.
3. Assessment of practical record and viva voce on it will be done by a Board of Examiners, consisting of one external examiner and one internal examiner, as practical examinations.
4. Improvement/repeat cases must prepare either an improved form of their earlier practical record or prepare a new one. They must get it approved and signed by the faculty member teaching the course at their parent department.
5. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.

LIST OF READINGS

Essential Readings:

1. Chang, Kang-Tsung: *Introduction to Geographic Information Systems*, 4th ed., Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.
2. DeMeers, Michael N.: *Fundamentals of Geographic Information Systems*, 4th. ed., John Wiley and Sons, Toronto, 2008.
3. Fazal, S.: *GIS Basics*, New Age International Publishers, New Delhi, 2008.
4. Fazal, S. and Rahman, A.: *Geographic Information System (GIS) Terminology*, New Age International Publishers, New Delhi, 2007.
5. Heywood, Ian Cornelius, Sarah and Steve Carver.: *An Introduction to Geographical Information Systems*, 2nd ed., Pearson Education Limited, Toronto, 2006.
6. Siddiqui, M.A.: *Introduction to Geographical Information Systems*, Sharda Pustak Bhavan, Allahabad, 2006.
7. Wise, S.: *GIS Fundamentals*, 2nd. Ed., CRC Press, 2013.

Further Readings:

1. Aronoff, S.: *Geographic Information Systems: A Management Perspective*, WDL Publications Ottawa, Canada, 1992.
2. Bolstad, P.: *GIS Fundamentals: A First Text on Geographic Information Systems*, 5th ed., XanEdu Publishing Inc., 2016
3. Brewer, C.A.: *Designing Better Maps: A Guide for GIS Users*, ESRI Press, 2005.
4. Burrough, P. A., McDonnell, R. A. and Lloyd, C.D.: *Principles of Geographical Information Systems*, 3rd. ed., Oxford University Press, Toronto, 2016.
5. ESRI: *Understanding GIS*, Environmental Systems Research Institute, U.S.A., 1993.
6. ESRI: *Esri Map Book*, Volume 32, Esri Press, 2017.

7. Graser, A.: *Learning QGIS: Create great maps and perform geoprocessing tasks with ease*, 3rd. ed., Packt Publishing, 2016.
8. Jefrey, S. & John, E.: *Geographic Information Systems – An Introduction*, Prentice Hall, New Jersey, USA, 1990.
9. Lo, C.P and Albert K.W., Yeung: *Concepts and Techniques of Geographic Information Systems*, 2nd edition., Pearson Education Inc., Toronto, Canada, 2007.
10. Longley, Paul A., Goodchild, Michael F. Maguire, David J., and David W. Rhind.: *Geographic Information Systems and Science*, 3rd edition., John Wiley and Sons, England, 2011.
11. Pinde Fu, P.: *Getting to Know Web GIS,* Esri Press, 2018.
12. Tahir, H., Abineh, T., and Ayele, B.: *Geographic Information System (Theory and Practical Manual)*, Lambert Academic Publishing, 2015.

Pedagogy: Basic fundamentals of GIS and GPS are introduced by demonstrating with the help of audio-visual aids. For GPS exercises students will be taken for a field trip to the university grounds. Audio visual aids like power point presentations and demonstration of practical exercises will be guiding principles of teaching methodology. Students will be preparing their practical exercises by working in the GIS lab on GIS software.

GOEG 304: ANY ONE OF THE FOLLOWING OPTIONAL COURSES

OPTION (i): REGIONAL DEVELOPMENT AND PLANNING IN INDIA

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To familiarise the students with the theoretical and conceptual foundations of this branch.
- To understand the regional development process in India.
- To sensitize the student about the changes taking place in regional structure of Indian economy.

COURSE CONTENT

Unit-I

i. Concept of regional development, Regional Policies in the Indian Five-Year Plans, NITI Aayog
ii. Experiences of regional planning in India - multi level planning (state, district, block and village panchayat)

Unit-II

iii. Centre state relations and the constitutional framework for multi-level planning.
iv. Devolution of financial resources and the multi-level planning.

Unit-III

v. Development Programmes for Backward Areas: hill with focus on North Himalayan States, drought-prone, desert, border, aspirational districts including Left- wing extremist (LWE) districts

Unit-IV

vi. Development plans for tribal areas, north- eastern region, KBK region of Odisha, coastal areas and islands.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).

2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Brahumananda, P.R. and Others: *The Development Process of the Indian Economy*, Himalaya Publishing House, New Delhi, 1987.
2. Dutt, A.K. (ed.), *India: Resources, Potentialities and Planning*, Kendall/Hutchinson, Iowa, 1972.
3. Friedmann, J. and Alonsa, W., *Regional Development and Planning – A Reader*, M.I.T. Press, Cambridge, Mass, 1967.
4. Gosal, G.S. and Krishan, G., *Regional Disparities in Levels of Socio-Economic Development in Punjab*, Vishal Publications, Kurukshetra, 1984.
5. Government of India, *Report of the Working Group on Block Level Planning* (M.L. Dantwala Committee), New Delhi, 1978.
6. Government of India, India *Three Year Action Agenda, 2017-18 to 2019-20*, NITI Aayog, New Delhi, 2017
7. Glikson, Arthur: *Regional Planning and Development*, Netherlands Universities Foundation for International Co-operation, London, 1955.
8. Mishra, R.P. et al.: *Multi-Level Planning*, Heritage Publishers, Delhi, 1980.
9. Mohan, K.: *Addressing Regional Backwardness, An Analysis of Area Development Programmes in India*, Manak Publications, New Delhi, 2005.
10. Raza, Moonis (ed.): *Regional Development*, Heritage Publishers, Delhi, 1988.
11. Radha Krishna, R. *India Development Report*, Oxford University Press, 2008.
12. World Development Report: *Sustainable Development in a Dynamic World, Transforming Institutions, Growth and Quality of Life*, OUP, 2003.
13. World Development Report: *Reshaping Economic Geography*, The World Bank, 2009.

Further Readings:

1. Blij, H.J. and Peter O. Muller: *Geography, Realms, Regions and Concept*, 7th Edition, John Wiley & Sons, Inc., New York, 1994.
2. Govt. of India: *Five Year Plans, Plan 1st -11th Plan*, Planning Commission, New Delhi.
3. Jain, L.C. and Others: *Grass without Roots, Rural Development under the Government Auspices*, Sage Publications for Institute of Social Studies, 1985.
4. Kant, S. et al.: *Reinventing Regional Development*, Rawat Publications, N. Delhi, 2004.
5. Misra, R.P. et al.: *Regional Development Planning in India*, Concept Pub., New Delhi, 1974.
6. Nangia, S. et al.: *Development Concerns in the 21st Century*, Concept Publishing, 2010.
7. Prasad H. P.: *Political Economy of Indian Development*, Oxford University Press, Delhi, 1988.
8. Raza M. (ed.): *Regional Development*, Heritage Publishers, Delhi, 1988.
9. Sen, A.K.: *On Economic Inequality*, Oxford University Press, New Delhi, 1973.
10. Sundaram, K.V.: *Geography of Under Development, The Spatial Dynamics of Under Development*, Concept Publishing, New Delhi, 1983.
15. Sundaram, K.V.: *Urban Regional Planning*, Concept Publishing, New Delhi, 1974.

Pedagogy: The students should be encouraged to participate in classroom discussions on the regional dimensions of planning and regional development in India in terms of spatial structure of economy, society and associated issues such as poverty, disparities and unemployment.

OR

OPTION (ii): SPECIAL THEMES IN AGRICULTURAL GEOGRAPHY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To discuss how agriculture originated, diffused and developed in different parts of the world, what are the recent approaches used to study the subject matter and how various economic laws affect agriculture.
- To familiarize the students with locational models, diffusion models and various forms of modern agriculture. In its second part, the course aims to apprise the students with Indian agriculture as to how it developed after Independence, what are its main features, problems and policy.
- In addition, it also familiarizes the students with the process of transformation of agriculture, through their actual field visits to selected villages of the Green Revolution region.

COURSE CONTENT

Unit-I

i. Origin, dispersal and development of agriculture in the world.
ii. Economic principles and agriculture.

Unit-II

iii. Locational theory and landuse: Von Thunen`s model of agricultural landuse.
iv. Diffusion of innovations: Types of spatial diffusion, T. Haggerstrand's neighbourhood effect
v. model of agricultural innovation diffusion.

Unit-III

vi. Green Revolution in India, the Punjab model of agricultural development.
vii. Regionalisation of agriculture in India and a brief discussion of each region.

Unit-IV

viii. Indian agriculture - Its characteristics and problems.
ix. Agricultural policy in India.

Note

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Hussain, M., *Agricultural Geography*, Inter India Publications, Delhi, 1979.
2. Hussain, M., *Systematic Agricultural Geography*, Inter India Publications, Delhi, 1996.
3. Hussain, M, *Systematic Agricultural Geography*, Rawat Pub. 2004
4. Ilbery, B. W., *Agricultural Geography*, Oxford University Press, Oxford, 1985.
5. Singh, J. and Dhillon, S.S., *Agricultural Geography*, Tata McGraw Hill, New Delhi, 1984.
6. Singh, Jasbir, *Dynamics of Agricultural Change*, Oxford, New Delhi, 1990.
7. Shafi Mohammad, *Agricultural Geography*, Dorling Kindersley (India) Delhi, 2006.

8. Swaminathan, M.S.: *50 Years of Green Revolution, An Anthology of Research Papers, M S Swaminathan Research Foundation, India* https://doi.org/10.1142/10279 2017

Further Readings:

1. Anon: *Agriculture Policy- Vision 2020,* Indian Agricultural Institute, New Delhi.
2. http//: www.planningcommission.nic.in/reports/genrep/bkpap2020/24_bg2020.pdf.
3. Agricultural Policies in India OECD and Indian Council for Research on International Economic Relations**,** 2018, https://doi.org/10.1787/9789264302334-en.
4. Conkling, E.C. and Yeats, M., *Man's Economic Environment*, McGraw, New York, 1976
5. Deshpande, C.D., *India: Regional Interpretations*, ICSSR, New Delhi, 1991.
6. Mohamed Noor (ed.), *Perspectives in Agricultural Geography*, Vol. 1., Concept, 1981.
7. Morgan, B.W. and Munton, J.C., *Agricultural Geography*, Methuen, London, 1971.

Pedagogy: The students should be acquainted with the development of agriculture over time and space in the world, and with the various models in agricultural geography. They should be sensitized to identify types of farming being practiced in different parts of India along with the problems, policy and the process of agricultural transformation especially after the mid 1960's.

OR

OPTION (iii): BIOGEOGRAPHY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To introduce the student to the concept of biogeography, interpretation and applications of biogeographical information.
- To make students aware of processes and mechanisms of evolution, speciation, diversification and extinction.
- To Sensitize students to contemporary issues in biogeography, conservation and restoration of ecology forms the basis of this course.

COURSE CONTENT

Unit –I

Introduction to Biogeography

i. Biogeography: Nature, Scope and Applications
ii. Biogeographical Information: Data Collection and Retrieval methods
iii. Spatial Dimension in Biogeography

Unit –II

Biogeographical Processes and Mechanisms

iv. Speciation and Diversification
v. Dispersal and Extinction
vi. Factors Influencing the Distribution of Life; Biogeographical Regions

Unit –III

Contemporary Issues in Biogeography

vii. Island Biogeography; Biodiversity
viii. Habitat Fragmentation; Conservation Biogeography
ix. Biogeographical Consequences of Global Change

Unit –IV

Biogeography of Humankind

x. Biogeography of Primates and the Early Hominids
xi. Rise of genus *'Homo'* and global spread of *Homo sapiens*
xii. Humans as evolutionary and extinction force

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Cox C.B., Moore P.D. and Ladle R.J.: *Biogeography: An Ecological and Evolutionary Approach,* 9th edition, John Wiley & Sons, UK, 2016.
2. MacDonald, Glen.: *Biogeography: Introduction to Space, Time, and Life*, John Wiley, New York, 2003.
3. Mark Lomolino, Brett R. and Whittaker, R.J. *Biogeography*, 5th Edition, Sinauer. 2017
4. Richard John Huggett*: Fundamentals of Biogeography*, Taylor and Francis: New York, 2004.
5. Robert H. MacArthur and Edward O. Wilson: *The Theory of Island Biogeography*, Princeton University Press: New Jersey, 1967.
6. Spellerberg, Ian F. and John W.D. Sawyer: *An Introduction to Applied Biogeography,* Cambridge University Press: Cambridge, 1999.

Further Readings:

1. Cox C.B., Moore P.D.: *Biogeography: An Ecological and Evolutionary Approach*, 7th edition, Blackwell Science, Cambridge, 2007.
2. Kormondy, E. J.: *Concepts of Ecology*, Third Edition, Prentice-Hall of India: New Delhi, 1989.
3. Mathur, H.S.: *Essentials of Biogeography*, Pointer Publishers: Jaipur, 1988.
4. Robinson, H.: *Biogeography*, Macdonald and Evans: London, 1982.
5. Taylor, J.A. (ed): *Themes in Biogeography*, Croom Helm: London, 1984.
6. Tivy, Joy: *Biogeography: A Study of Plants in the Ecosphere*, Longman Scientific & Technical: UK, 1993.

Pedagogy: The students should be taken on field visits to the local floral-fauna zones; they should be acquainted with the local biogeography of the areas. Seminars/lectures should be organized where speakers from the allied disciplines- environmental sciences, ecology, biosciences, should be invited to discuss with the students the various issues of biogeography with a multidisciplinary approach.

OR

OPTION (iv): SOCIAL GEOGRAPHY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To familiarise the student with the theoretical and conceptual grounding of this branch
- To understand the formation of socio-cultural regions in the context of historical and social factors in India
- To sensitize the student about the process of social transformation and change and its interface with developmental and political aspects in India.

COURSE CONTENT

Unit-I

i. Definition, Nature and Scope of Social Geography.
ii. Social Geography in the Realm of Social Sciences.
iii. Concepts and Themes in Social Geography:
a. Social space b. Social segregation. c. Social justice d. Social well-being e. Ethnicity.

Unit-II

iv. Evolution of Socio-Cultural Regions in India:
a. Evidence from classical literature b. Core and peripheral regions.
v. Attributes of Spatial Distribution of:
a. Tribes b. Religion c. Language d. Caste

Unit-III

vi. Social Transformation and Change in India:
a. Modernization and Sanskritization.
b. Role of rural-urban interaction.
c. Problems of social transformation

Unit-IV

vii. Social and Ethnic Diversity of India and National Integration.
viii. Cultural Pluralism and Development.

Note

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Ahmad, Aijazuddin: *Social Geography*, Rawat Publications, New Delhi, 1999.
2. Casino Jr., V.D., M.E. Thomas, P. Cloke, R. Panelli (eds.).: *A Companion to Social Geography*, Blackwell Publishing Ltd., London, 2011.
3. Casino Jr., V.D.: *Social Geography: A Critical Introduction*, John Wiley & Sons, London, 2009.
4. Jones, E. and J. Eyles: *An Introduction to Social Geography*, Oxford Univ. Press, London, 1977.
5. Jones, Emrys (ed.): *Readings in Social Geography*, Oxford University Press, London, 1975.
6. Khare, R.S.: *Cultural Diversity and Social Discontent*, Sage India, New Delhi, Sage India, 1998.
7. Rao, M.S.A.: *Urbanisation and Social Change*, Orient Longmans, New Delhi, 1970.
8. Sareen, T.R. and S.R. (ed.): *Castes and Tribes of India*, Anmol, New Delhi, 1993.
9. Singer, M. and B.S. Cohn (ed.): *Structure and Change in Indian Society*, Aldine, Chicago, 1968.
10. Singh, K.S.: *Tribal Situation in India*, Indian Institute of Advanced Studies, Shimla, 1972.
11. Smith, S.J., R. Pain, S.A. Marston and J.P. Jones III (eds).: *The Sage Handbook of Social Geographies*, Sage, London, 2010.
12. Sopher, David E.: *An Exploration of India*, Longman, London, 1980.
13. Srinivas, M.N. (ed.): *Caste: Its Twentieth Century Avatar*, Penguin India, New Delhi, 1997.

Further Readings:

1. Atreya, B.L. et.al. (ed.): *Indian Culture*, Universal Publications, New Delhi, 1966.

2. Dubey, S.C.: *Indian Society*, National Book Trust, New Delhi, 1991.
3. Enos, R.D.: *The space between us: Social geography and politics*, Cambridge University Press, Cambridge, 2017.
4. Sen, Amartya, and Dreze Jean: *Indian Development: Selected Regional Perspectives*, Oxford University Press, Delhi, 1996.

Pedagogy: The students shall be encouraged to participate in classroom discussions on the socio-spatial aspects of current issues of social, political and developmental importance.

OR

OPTION (v): POLITICAL GEOGRAPHY OF INDIA

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: The aim of this course is to familiarise the student with the idea of geographical influences on political landscape of India and to train the students to look at Indian political scenario, issues and challenges from geographical lenses.

COURSE CONTENT

Unit-I

i. Geographical Bases of the Indian State: Territoriality, Location and size; Population: Distribution, ethnic and religious composition, quality; Implications in the current geopolitical context.

Unit-II

ii. Geographical Factors in India's Political History: Centripetal and centrifugal forces;
iii. Role of terrain, rivers and sea coasts in shaping political history;
iv. Geography of internal conflicts and problems of Nation Building: Religious conflicts: Linguistic conflicts, separatist movements, terrorism; environmental movements, river water disputes.

Unit-III

v. Geography of Electoral support and Representation: Constituencies and their evolution;
vi. Redistricting: Issues and concerns; Patterns of electoral support and representation; politico-electoral regions of India.

Unit-IV

vii. Geography of International Relations: India's bilateral relations with SAARC nations; India's position in the Indian Ocean region; between two worlds India's position in world politics.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Adhikari, S.: *Political Geography*, Rawat Publications, Jaipur and Delhi, 1997.
2. Bandyopadhya, J.: *The Making of India's Foreign Policy*, Allied Publications, Delhi, 1991.
3. Bhambri, C.P.: *Political Process in India*, Vikas, New Delhi, 1991.
4. Brass, P. R.: *The Political Economy of India Since Independence*, Cambridge University Press, New Delhi, 1990.
5. Brass, P.R.: *Caste, Faction and Party in Indian Politics*, Vol. I and II, Chankya Publications, Delhi, 1983.
6. Brass, P.R.: *The Production of Hindu Muslim Violence in Contemporary India*, Oxford University Press, Delhi, 2003.

Further Readings:

1. Basu, S.: *Regional Movement: Ethnicity Identity*, Indian Institute of Advanced Study, Shimla, 1992.
2. Deshpande, C.D.: *India: A Regional Interpretation,* I.C.S.S.R, New Delhi, 1992.
3. Harrisson, S. et. al. (ed.): *India and Pakistan: The First Fifty Years*, Woodrow Wilson Centre and Cambridge University Press, 1999.
4. Oommen, T.K.: *Protest and Change Studies in Social Movements*, Sage, New Delhi, 1990.
5. Pannikar, K.N.: *Geographical Factors in India's History*, Bharatiya Vidya Bhavan, Bombay, 1955.
6. Rudolph and Rudolph: *In Pursuit of Lakshmi: Political Economy of India Since Independence,* Oxford University Press, Delhi, 1987.
7. Schwartzberg, J.: *A Historical Atlas of South Asia*, Oxford University Press, Delhi, 1989.
8. Weiner, M. and J. Osgoodfield (ed.): *Electoral Politics in the Indian States*, Centre for International Studies, MIT, 1975.
9. Varshney, A.: *Ethnic Conflict and Civic Life: Hindus and Muslims in India*, Yale University Press, New Haven, 2002.

Pedagogy: The students should try to understand the functioning of Indian federal systems and recent changes in its nature taking place in the context of globalization process.

OR

OPTION (vi): APPLIED CLIMATOLOGY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To introduce and discuss the basic topics of applied climatology
- To understand how these concepts can be useful in everyday planning and operations.

COURSE CONTENT

Unit -I

i. Applied Climatology: History; Development; Atmospheric Concern and Awareness; Climate Impact Assessment.
ii. Basic Climatic Elements: Radiation; Temperature; Moisture, Clouds and Precipitation; Air Pressure and Winds.
iii. Major Controls of Climate: Latitude, Geographic Position, Land and Water, Prevailing Winds, Ocean Currents, Altitude, Pressure and wind System.

Unit -II

iv. Weather Analysis: Data Acquisition and Dissemination
v. Weather Forecasting: Methods, Types, Accuracy
vi. Medium Range Forecasts, Long Range Forecasts.
vii. Satellites in Weather Forecasting.

Unit -III

viii. Air Pollution: Sources and Types of Air Pollution
ix. Meteorological Factors Affecting Air Pollution
x. Acid Precipitation.
xi. Urban Heat Island

Unit -IV

xii. Climatic Change: Definition and Detection: Seafloor Sediment, Glacial Ice, Tree Rings, Oxygen Isotope -Analysis
xiii. Natural Causes of Climate Change: Plate Tectonics, Volcanic Activity, Orbital Variations, Solar Variability
xiv. Human Impact on Global Climate

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Barry and Chorley: *Atmosphere: Weather and Climate*, 8th Edition, Routledge, Londan, 2003.
2. Barry, R.G. & Chorley, R.J.: *Atmosphere, Weather and Climate*, Methuen Co. Ltd., London, 5th Edition, 1987.
3. Bhutani, Smita: *Our Atmosphere*, Kalyani Publishers, Ludhiana, 2000.
4. Darrel Hess: *Mcknight's Physical Geography: A Landscape Appreciation*, Prentice Hall of India Pvt. Ltd., New Delhi, 2012.
5. Frederick K. Lutgens & Edward J. Tarbuck: *The Atmosphere: An Introduction to Meteorology*, Prentice Hall of India Pvt. Ltd., New Delhi, 2012.
6. Lal, D.S.: *Climatology*, thoroughly revised and Enlarged Edition, Sharda Pustak Bhaban, Allahabad, 2009.
7. Lydolph, P.E.: *The Climate of the Earth*, Rowman Nad Allanheld, Totowa, New Jersey, 1985.
8. Oliver, John E.; Oliver, John and Hidore John J*: Climatology: An Atmospheric Science*, Prentice Hall of India Pvt. Ltd. New Delhi, 2001
9. Strahler, A.N.: *Modern Physical Geography*, John Wiley and Sons, New York, Singapore, 1987.
10. Strahler, A and A. Strahler: *Introducing Physical Geography*, 6th Edition, John Wiley & Sons, Hoboken, New Jersey, 2013.
11. Strahler, A. and A. Strahler: *Physical Geography: Science and Systems of Human Environment*. 3rd Edition, John Wiley, Hoboken, New Jersey, 2005.
12. Trewarth, G.T.: *Eath's Problem Climate*, University of Visconsin, Madision, 1961.
13. Trewartha, G.T.: *An Introduction to Climate*, McGraw Hill, New York, 1980, Fifth Edition (International Student Edition).

Further Readings:

1. Ackeman Steven A and Knox John A.: *Meteorology: Understanding the Atmosphere*, 3rd Edition, Johns & Batlet Learning, Canada, 2012.
2. Aguado, E. & Burt, J.E.: *Understanding Weather and Climate*, Prentice-Hall, Inc., Upper Saddle River,New Jersey, 1999
3. Oliver,J. and Hiddore: *Climatology: An Atmospheric Science*, 2nd Edition, Persson Education, Delhi, 2003.
4. Rumney, G.R.: *Climatology and the World Climates*, Macmillan, London, 1968.
5. Thompson Russell D.: *Applied Climatology - Principles & Practice*, John Willey, New York, 1997.
6. Tadaki, M. & Salmond, J. & Le Heron, R.: *Applied climatology*. Progress in Physical Geography. 38. 392-413. 2014. 10.1177/0309133313517625.
7. Hobbs, J. E.: *Applied Climatology: A Study of Atmospheric Resources*, Butterworth-Heinemann, London, 1981.
8. Philander, S. G. (ed.): *Encyclopedia of Global Warming and Climate Change*, 2nd Edition, SAGE Publications, Inc., 2012.
9. Schneider, S. H., Root, T. L., and Mastrandrea, M. D. (eds.): *Encyclopedia of Climate and Weather,* 2nd Edition*,* Oxford University Press, New York, Vol I, II, 2011.

Pedagogy: If possible, audio - visual aids will be arranged to explain weather phenomena to the students. Visits for the students to the nearest Weather Observatory and Meteorological Department will be arranged to know the functioning of various weather instruments and to understand weather conditions with the help of Weather and Climate Charts.

SEMESTER IV

GEOG 401: REGIONAL PLANNING

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives: The aim is to understand and evaluate the concept of region in geography and its role and relevance in regional planning. It will help to identify the issues relating to the development of the region through the process of spatial organization of various attributes and their interrelationship. The course also intends to help students in identifying the causes of regional disparities in development, perspectives and policy imperatives.

COURSE CONTENT

Unit-I

i. The planning process: Concept and types
ii. Regional planning; concept, difficulties, rationale, principles and objectives
iii. Role of geography in regional planning.

Unit-II

iv. Preparation of a regional plan.
v. Regions for planning: Regional awareness, region and its evolution;
vi. Planning regions; characteristics, hierarchy, need, demarcation; planning regions of India.

Unit-III

vii. Surveys for planning: Concept and functions; types of surveys
viii. Regional surveys, diagnostic surveys, techno-economic surveys.
ix. Role of Remote Sensing, GIS and GPS.

Unit-IV

x. The process of regional development: Indicators of development; levels of regional development and disparities; strategies for development.
xi. Case studies from selected countries: Regional planning in USA (TVA); Regional planning in India (DVC & NCR); Regional planning in Netherlands (Polders).

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the hole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of eight questions will be set out of the whole syllabus, at least *two* from each unit. The candidates will attempt ***four*** questions selecting one from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidate(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Alden, J. & Morgan, R.: *Regional Planning–A Comprehensive View*, Leonard Hill Books, Beds, 1974.
2. Tewdwr-Jones, M., Nicholas Phelps and Robert Freestone (eds.): *The Planning Imagination: Peter Hall and the Study of Urban and Regional Planning*, edited by, Routledge, London, 2014.

3. Ali Khaksari R, *A Guidebook on Urban and Regional Planning*, LAP Lambert Academic Publishing 2011
4. Bhat, L.S. & Others (ed.): *Regional Inequalities in India*, Society for the Study of Regional Disparities, New Delhi, 1982.
5. Bhat, L.S.: *Regional Planning in India*, Statistical Publishing Society, Calcutta, 1972.
6. Chand, Mahesh and Puri, V.K.: *Regional Planning in India*, Allied, New Delhi, 2011.
7. Chandna, R. C.: *Regional Planning: A Comprehensive Text*, Kalyani Publishers, New Delhi, 2000.
8. Chandna, R. C.: *Regional Planning and Development*, Kalyani Publishers, New Delhi, 2014.
9. Glasson, John: *An Introduction to Regional Planning*, Hutchinson Educational, London, 1984.
10. Glasson, John and Marshall, Tim: *Regional Planning Natural and built environment series*, Routledge, 2007.
11. Glikson, A.: *Regional Planning and Development*, Leiden, London, 1955.
12. Gore, Charles: *Regions in Question, Space, Development Theory and Regional Policy*, Methuen, London, 2012.
13. Gupta, H.S., *Regional Development and Planning, Concepts, Theories and Techniques*, Kalyani Publishers, New Delhi, 2017
14. Lipovska B, *Research Methods in Urban and Regional Planning*, Koros Press Limited, 2016
15. Misra, R.P. & Others (ed.): *Regional Development Planning in India*, Vikas, New Delhi, 1974
16. Nath, V., *Regional Development and Planning in India***,** Concept Publishing Company**,** London, United Kingdom, 2007
17. Prakasa Rao V.L.S.: *Regional Planning*, Asia Publishing House, Bombay, 1968.
18. Ray, Jayasri: *Introduction to Development & Regional Planning*, Orient BlackSwan,2001
19. Sundaram, K.V. (ed.): *Geography and Planning*, Concept, New Delhi, 1985.
20. Verma, Neha, *Urban Planning*, Vikas Book House, Pune.,2018

Further Readings:

1. Bludon, John & Others (eds.): *Regional Analysis and Development*, Harper & Row, London, 1973.
2. Burrough, A.: *Principles of Geographic Information Systems for Land Resource Assessment*, Clarendon Press, Oxford, 1986.
3. Chadwick, G.: *Systems View of Planning*, Pergamon Press, Oxford, 1971.
4. Faludi, Andreas: *Reader in Planning Theory*, Pergamon Press, Oxford, 1976.
5. Freeman, T.W.: *Geography and Planning*, Hutchinson, London, 1967.
6. Friedman, John and Clyde Weaver: *Territory and Function: The Evolution of Regional Planning*, Edward Arnold, London, 1979.
7. K. Siddhartha**,** S. Mukherjee: *Models & Theories in Geography*, Kitab Mahal, 2018.
8. Lavrov, S. and Sdasyuk, G.: *Concepts of Regional Development*, Progress Publishers, Moscow, 1988.
9. Misra, R.P. & Others (eds.): *Regional Planning: Concepts, Techniques, Policies and Case Studies*, University of Mysore, Mysore, 1992.
10. Philip R. Berke and David Godschalk: *Urban Land Use Planning*, University of Illinois Press, 5th Edition, 2006.

Pedagogy: The students should be made to do sessional assignments based on diverse data to formulate regions at the local and regional levels and to identify the regional differentiations. They should be made conversant with the trends in the development of the regional aspects using 'space' in the multi-disciplinary approach to regional development.

GEOG 402: DISSERTATION (PRACTICAL ONLY)

Max. Marks: 100
Dissertation: 50 Marks
Viva Voce: 30 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To acquaint the student with the importance of field work as one of the methodologies in Geography.
- To sensitize the student about pre-field work preparations, conduct of the field work, post-field work-based analysis and interpretation
- To acquaint the student with the requirements of the writing of a dissertation.

COURSE CONTENTS: Since this paper is of practical nature only, therefore contents of syllabus need not to be organized into units. Students must prepare a dissertation on a theme that involves field investigation and data collection.

Dissertation in Geography: The work will involve:

- Statement of objectives and scope of field investigation;
- Methods of field work for studies of different scales (macro, meso, and micro)
- Preparation of a questionnaire; sampling techniques, data collection tools and procedure
- Processing and analysis of collected data
- Representation and interpretation of data/information.
- Writing a dissertation on assigned problem involving field investigations

Note

1. The candidates are required to submit their dissertation one week before the commencement of end semester examination.
2. Assessment of dissertation and viva voce on it will be done by a Board of Examiners, consisting of external examiner, internal examiner and the chairperson of the department.
3. Improvement/repeat cases must prepare either an improved form of their earlier work or prepare a new one. They must get it approved and signed by the faculty member teaching the course at their parent department.
4. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.

LIST OF READINGS

Essential Readings:

1. Archer, J.E. and Dalton, T.H.: *Field Work in Geography*, E.T. Bastaford Ltd., London, 1968.
2. Creswell, John W., *Research Design; Qualitative, Quantitative and Mixed Methods Approach*, SAGE Publications, Los Angeles, 2008.
3. Flick, U. *An Introduction to Qualitative Research*, 5th Edition, SAGE, 2014.
4. Jones, P.A.: *Field Work in Geography*, Longman, London, 1968.
5. Kothari, C. R., *Research Methodology, Methods & Techniques,* New Age International Publisher, N. Delhi, 2008.
6. Kumar Ranjit, *Research Methodology: A step-by-step Guide for Beginners*, SAGE Publications, Ltd. London (Third Edition), 2010.
7. Montello, D. and P. Sutton, *An Introduction to Scientific Research Methods in Geography and Environmental Studies*, SAGE, 2012

Further Readings:

1. Bennet P. Lientz and Kathryn P., *Project Management for the 21st Century*, Academic Press, California, 1995.
2. Earickson, R., and Harlin, J., *Geographic Measurement & Quantitative Analysis*, Macmillan, New York, 1994.

3. Gregory, S.: *Statistical Methods and the Geographers*, Longman, London, 1963
4. Misra, H. N and V. P. Singh, *Research Methodology in Geography, Social, Spatial and Policy Dimensions*, Rawat Publications, N. Delhi, 1998.
5. W. E. Huxold & A. G. Lerinsons Aronoft. S., *Managing Geographic Information Projects*, 1989.

Pedagogy: The field-work exercises should aim at identification of locational attributes of selected elements and their areal associations. The students are to be trained through taking up exercises requiring field visits and generation of primary data, its processing and statistical and cartographic representation.

GEOG 403: QUANTITATIVE METHODS IN GEOGRAPHY (Theory and Practical)

Max. Marks: 100
Theory Paper: 50 Marks
Practical Record and Viva Voce (20+10): 30 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To provide knowledge of statistical techniques and their application in geography;
- To train the students to apply these techniques and methods to the analysis of the geographic problems.

COURSE CONTENT

Unit-I

i. Quantification in Geography: Types of spatial data (point, line and area) and levels of their measurement (nominal, ordinal, interval and ratio), census, and sample surveys, sampling designs (with special reference to spatial data).

Unit-II

ii. Measures of central tendency: Mean, median and mode; mean centre, median point, point of minimum aggregate travel distance, and population potential.

Unit-III

iii. Measures of dispersion: Range, quartile deviation, mean deviation, standard deviation and variance; coefficient of variability and Lorenz Curve, index of spatial dispersion, median distance, standard distance and nearest neighbour analysis.

Unit-IV

iv. Correlation and Regression: Scatter diagram, correlation by Spearman's Rank Difference and Karl Pearson's Product Moment Methods, regression analysis, construction of regression line; Coefficient of areal correspondence.

Note

1. A compulsory question containing 10 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 7 questions in about 25-30 words each. Each question shall carry 2 marks (total 14 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least 2 from each unit. The candidates will attempt ***4*** questions selecting one from each unit carrying 9 marks (total 36 marks). These will be in addition to the compulsory question at serial number 1.
3. Assessment of practical record and viva-voce on it will be done by a Board of Examiners, consisting of one external examiner and one internal examiner, as practical examinations.
4. Improvement/repeat cases must prepare either an improved form of their earlier practical record or prepare a new one. They must get it approved and signed by the faculty member teaching the course at their parent department.
5. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
6. Calculators are not allowed.

LIST OF READINGS

Essential Readings:

1. Burt, J.E., G.M. Barber and D.L. Rigby: *Elementary Statistics for Geographers*, Guilford Press, New York, 2009.
2. Clark, W.A.V. and P.L. Hosking: *Statistical Methods for Geographers*, Wiley, New York, 1986.
3. Ebdon, D.: *Statistics in Geography*, Blackwell Publishers, New York, 1985.
4. Elhance, D.N.: *Fundamentals of Statistics*, Kitab Mehal, Allahabad, 1976.
5. Gupta, C.B.: *An Introduction to Statistical Methods*, Ram Prasad and Sons, Agra, 1971.
6. Gupta, S. P.: *Statistical Methods*, Sultan Chand and Sons, 2014.
7. Ott, R. Lyman and Michael Longnecker: *An Introduction to Statistical Methods and Data Analysis*, Brooks/Cole, USA, 2010.
8. Peter, J. Taylor: *Quantitative Methods in Geography*, Houghton Mifflin Company, Boston, 1977.
9. Hammond, R. and P. McCullagh: *Quantitative Methods in Geography*, Clarendon Press, Oxford, 1974.

Further Readings:

1. David M. Smith: *Patterns in Human Geography*, Pengiun, Harmondsworth, 1975.
2. Montello, D.R. and Sutton, P.C.: *An Introduction to Scientific Research Methods In Geography*, Sage Publication Inc., California, 2006.
3. Pal S. K.: *Statistical Techniques - A Basic Approach to Geography*, Tata McGraw Hill, New Delhi, 1982.
4. Peter Haggett, Andrew D. Cliff and Allan Frey: *Locational Models*, Vols. I and II, Arnold Heinemann, New Delhi, 1977.
5. Rogerson, Peter. A.: *Statistical Methods for Geography: A Student's Guide*, Sage Publications, London, 2015.
6. Sarkar, Ashis: *Quantitative Geography: Techniques and Presentations*, Orient Blackswan, United States, 2013.

Pedagogy: The students should be made to understand the importance of quantification in Geography. They should be taught the basic techniques and their application in geographic research by giving simple and small examples from the field of Geography.

GEOG 404: ANY ONE OF THE FOLLOWING OPTIONAL COURSES:

OPTION (i): URBAN GEOGRAPHY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To familiarise the students with the theoretical foundations and recent trends in this branch of Geography.
- To provide an understanding of evolutionary, morphological, and functional attributes of urban places at different scales.
- To understand urban places as spaces of human habitation

COURSE CONTENT

Unit-I

Urban Geography: An Introduction

i. Definition, Scope and Approaches.
ii. Development and Recent Trends.
iii. Contribution of Indian scholars.

Unit -II

City: Attributes and Processes

iv. Setting: Location, Situation and Site (Definition, Types and Significance)
v. Internal Structure: Theories of Internal Structure, Internal Structure of Indian Cities, Comparison of Internal Structure of Planned and Evolved Cities, Urban Fringe
vi. Classification of Urban Places: Non-Functional Classification, Functional Classification

Unit-III

Urban Systems

vii. Urban Systems: Definition, Models of City-Size Distribution, Urban System in India
viii. City-Region Relations: Basis and Nature, Definition, Demarcation, Functional Structure of Umland.
ix. Cities as Central Places: Models of Christaller and Losch

Unit-IV

City as Lived Space

x. Negotiating the City
xi. Imagining the City
xii. Contemporary Urban Issues: Unequal City, Sustainability and the City, Governance, Violence in the City

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Carter, Harold: *The Study of Urban Geography*, Edward Arnold, London, 4th Edition, 1995.
2. Kaplan, D., J. Wheeler and S. Holloway.: *Urban Geography*, Wiley, USA, 2009.
3. Hubbard, P.: *City*, Routledge, London and New York, 2006.
4. Ganeshwari, S. Kahlon and V. Chandel., The City Alive: Humanising Urban Geographic Research in India, *Population Geography*, Vol. 37 (1&2), 2015.
5. Hall, T.: *Urban Geography*, Routledge, London and New York, 2006.
6. Mayer, H.M. & C.F. Kohn: *Readings in Urban Geography*, University Press, Chicago, 1959.
7. Pacione, Michael: *Urban Geography: A Global Perspective*, Routeledge, New York, 3rd Edition, 2007.
8. Sharma, K.D.: *Urban Development in the Metropolitan Shadow*, Inter-India, New Delhi, 1985.
9. Smailes, A.E.: *Geography of Towns*, Hutchinson, London, 1965.

Further Readings:

1. Paddison, R.: *Handbook of Urban Studies*, Sage: New Delhi, 2001.
2. Westwood, S. and J. Williams.: *Imagining Cities*, Routledge, London and New York, 1997.
3. Kundu, A.: *Urban Development and Urban Research in India*, Khanna Pub., New Delhi, 1992.
4. Short, John R.: *An Introduction to Urban Geography*, Routledge, London, 1984.

Pedagogy: The course shall be backed up with extensive use of examples from Indian urban places with the help of audio-visual aids and, depending upon feasibility, field trips.

OR

OPTION (ii): GEOGRAPHY OF FOOD SECURITY

Max. Marks: 100
Terminal Exam: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To make students understand various conceptual and methodological issues involved in food security system.
- To understand demand, supply and issues relating to availability and accessibility of food with special reference to developing countries and changes in the scenario in light of globalization process.

COURSE CONTENT

Unit-I

i. Food Security: concept, approaches (household economy and livelihoods), and methods of measurement.
ii. Concepts of poverty, hunger and malnourishment.

Unit-II

iii. Food security through sustainable agricultural development.
iv. Climate change and food security.

Unit-III

v. World patterns of major food resources: grain farming, animal husbandry and fisheries.
vi. World pattern of food security.

Unit-IV

vii. Spatial pattern of food security in India: trends and patterns of foodgrains production; patterns of poverty and hunger
viii. Government policies towards food security in India: Public Distribution System (PDS), Targeted Public Distribution System (TPDS), and Food Security Act.

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Acharya, K.C.S.: *Food Security System of India*, Concept Publication, New Delhi, 1983.
2. Asian Development Bank Agricultural, *Food Security and Rural Development*, Oxford University Press, New Delhi, 2010.
3. Chatterjee, B. and A.K. Karmakar: *Food Security in India*, Regal Pub., New Delhi, 2012.
4. Chopra, et. al. (ed.): *Crop Productivity and Sustainability- Shaping the Future*, Oxford and IBH Pub. Co., New Delhi,1998.
5. Chung, K., et. al., *Identifying the Food Insecure: The Application of Mixed Method Approaches in India*; International Food Policy Research Institute, Washington, 1997.
6. Das, S., Kumar Aruna, Nishanka: *Search For Food Security In Asia***,** Kalpaz Publications, 2017.
7. Food and Agriculture Organization: *The State of Food Insecurity in the World*, Report, 2012 (http. //www. fao.org).
8. Jharwal, S.M.: *Public Distribution System in India: Reassessed*, Manak Publication, New Delhi, 1999.
9. Morris, J.: Modern Biotechnology – Potential Contribution and Challenges for Sustainable Food Production in Sub-Saharan Africa, *Sustainability*, Vol, 3, pp. 809-822. 2011.
10. Mujumdar, N.A. and Uma Kapila (ed.): *Indian Agriculture in New Millennium: Changing Perceptions and Development Policy (Vol. II),* Academic Foundation, New Delhi, 2006.
11. Pinstrup-Andersen, P. and Watson II, D.: *Food Policy for Developing Countries: The Role of Government in Global, National, and Local food Systems*, Cornell University Press, 2011.
12. RuddarDatt and K.P.M. Sundharam: *Indian Economy*, S. Chand Publisher, New Delhi, 2007.
13. Valoon, G., S.G. Patil and L.B. Hurgar: *Agriculture Sustainability: Strategies for Assessment*, Sage Publication, New Delhi, 2005.
14. World Bank: *Perspectives on Poverty in India: Stylized Facts from Survey Date*, Oxford University Press, 2011.
15. World Bank: *Annual Report*, 2012, worldbank.org/annual report/2012.

Further Readings:

1. Aggarwal, P.K. (2008): *Global Climate Change and Indian Agricultural: Impact, Adaptation and Mitigation*, Indian Journal of Agricultural Science, Vol. 78, No. 10, pp. 911-919.
2. Capaldo, J. et al.: *A Model of Vulnerability to Food Insecurity*, ESA Working Paper NO. 10-03, Agricultural Development Economics Division (FAO), 2010.
3. Chatterjee B. and Kundo, S.: Food Security in Bangladesh – Patterns, Determinants, Interventions and Scope for Regional Cooperation, *Man and Development*, Vol. 33, No.3, pp. 25-58, 2011.
4. Clay, E.: *Food Security: Concepts and Measurements*, Paper for FAO Export Consultation on Trade and Food Security, Rome, 11-12 July, 2002.
5. Mishra, R. P.: *Population and Food Supply in Madhya Pradesh*, Northern Book Centre Publication, New Delhi, 1989.
6. Mohammad, N.: Regional Patterns of Food Security in India, *Annals, NAGI*, Vol. 21, Delhi, 2002.
7. Nagothu Udaya Sekhar: *Agricultural Development and Sustainable Intensification: Technology and Policy Challenges in the Face of Climate Change,* Routledge, 2018.
8. Radhakrihna, R.: Food and Nutrition- Challenge for Policy, *Journal of the Indian Society of Agricultural Statistics*, Vol. 53, No. 3., 1991.
9. Sen, A.K.: Poverty and Famines: *An Essay in Entitlement and Deprivation*, Oxford University Press, Delhi, 1981.
10. Shafi, M. and Aziz, A. (ed.): *Food Systems of the World*, Rawat Publication, Jaipur, 1989.
11. Thompson, H. et al.: *Climate Change and Food Security in Sub-Saharan Africa: A Systematic* Literature Review, *Sustainability*, Vol. 2, pp. 2719-2733, 2010.
12. Zhang-Yue Zhou, *Achieving Food Security in China: The Challenges Ahead Studies in the Modern World Economy*, Routledge, 2017

Pedagogy: The students are required to understand the deep-rooted dimensions of the whole concept of food security/insecurity in the world. This can be done by encouraging wide use of literature available in journals, books, research reports, atlases, maps and through interaction with students/researchers from other disciplines such as Economics, Sociology and Public Administration.

OR

OPTION (iii): QUALITATIVE RESEARCH METHODS IN GEOGRAPHY

Max. Marks: 100
Terminal Exam : 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To familiarise the students with basics of qualitative research and its significance.
- To make them understand how qualitative data are collected, classified and analysed.
- To train them to differentiate between casual and research-based statements.

COURSE CONTENT

Unit - I

i. Qualitative research: history, types and contribution to geography.
ii. Relationship between quantitative and qualitative geography.
iii. Contemporary qualitative geography

Unit - II

iv. Objectivity and subjectivity in qualitative data collection.
v. Qualitative research design: asking research questions, selecting cases and participants.

Unit - III

vi. Qualitative research methods:
   a. Interviewing: Types, design and practice; recording, transcribing and analysing.
   b. Focus' groups: composition; size and number of groups; recruiting participants.
   c. Case studies.

Unit - IV

vii. Computer assisted qualitative data analysis (CAQDA);
viii. Reasons for using computers for qualitative research;
ix. Strengths and weaknesses of CAQDA systems.

Note

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 questions in about 25-30 words each. Each question shall carry 2 marks (total 20 marks).
2. A total of 8 questions will be set out of the whole syllabus, at least *2* from each unit. The candidates will attempt *4* questions selecting 1 from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks (total 60 marks).
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidates(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Crang, M.A. & Cook, Z.: *Doing Ethnographies*, Sage Publication, London,2007
2. Emerson, R.M. et al.: *Writing Ethnographic field notes*, The University of Chicago Press, 1995.
3. Gang, M.: *Cultural Geography*, Routledge, London,1998
4. Hagget, P. et. al.: *Locational Analysis in Human Geography*, Arnold, London, 1977.
5. Harvey, David: *Explanation in Geography*, Arnold, 1969.
6. Kothari, C.R.: *Research Methodology*, Wiley Eastern Limited, New Delhi, 1988.
7. Misra, H.N. and V.P. Singh: *Research Methodology in Geography*, Rawat Pub., Jaipur, 1998.
8. Misra, R.P.: *Research Methodology*, Concept Publishing Company, New Delhi, 1989

9. Rimb, Melanie, Dwyer et al.: *Qualitative Methodologies for geographers- Issues & Debates*, Oxford University Press, New York, 2001
10. Strauss, A.: *Qualitative Analysis for Social Scientist*, Cambridge Univ. Press, New York, 1987.

Further Readings:

1. Denzin, N. and Lincoln, Y.: *The Sage Handbook of Qualitative Research*, 3rd Edition, Sage Publication, London. New Delhi, 2005.
2. Limb, M and Dwyer, C.: *Qualitative Methodology for Geographer*, Oxford University Press Inc., New York, 2001.
3. Montello, Danial R. and Paul C. Sutton: *An Introduction to Scientific Research Methods in Geography*, Sage Publications, London, 2006.
4. Ralph, Berry: *The Research Project: How to Write it*, Routledge, London, 1990.
5. Thomas, S.K.: *The Structure of Scientific Revolution*, Univ. of Chicago Press, Chicago, 1970.

Pedagogy: Students are expected to identify a small research problem. They must prepare a research proposal. Using suitable research methodology, they should try to answer their research questions.

OR

OPTION (iv): CLIMATE CHANGE AND EARTH SYSTEM

Max. Marks: 100
Terminal Exam.: 80 Marks
Internal Assessment: 20 Marks
Time: 3 Hours

Objectives:

- To promote inclusive knowledge of conceptual, philosophical and methodological issues of climate change and earth system.
- To foster comprehensive understanding of climate and climate change dynamics with a focus on changing relationships between human
- To understand climate change in light of environmental crisis and sustainability issues.

COURSE CONTENT

Unit-I

Climate & Climate Change: Basic Concepts

i. Climate Change: Concept and Basic Facts
ii. Natural and Anthropogenic Causes of Climate Change
iii. Sources of Information regarding Past Climate

Unit-II

Climate Change in the Past, Present and Future

iv. Global Changes during Precambrian Scenario (4.6 bya to 542 mya)
v. From Paleozoic Era to Mesozoic Era (542 mya to 65 mya)
vi. Changes During Cenozoic Era (65 mya to Present), Projected Climate Change

Unit-III

Climate Change and Global Initiatives

vii. Intergovernmental Panel on Climate Change (IPCC)
viii. UNFCC, Kyoto Protocol and Paris Agreement
ix. Politics of Climate Change and Developmental Issues

Unit-IV

Implications of Climate Change

x. Climate Change Issues: Carbon Cycle, Sea Level Change
xi. Climate Change and Weather extremes
xii. Climate Change Impacts on Water Resources, Biodiversity and Agriculture

Note:

1. A compulsory question containing 15 short answer type questions shall be set covering the whole syllabus. The student shall attempt any 10 parts in about 25-30 words each. Each part shall carry 2 marks (total 20 marks).
2. A total of eight questions will be set out of the whole syllabus, at least *two* from each unit. The candidates will attempt *four* questions selecting one from each unit. These will be in addition to the compulsory question at serial number 1 and each question will carry 15 marks.
3. Internal assessment may include written assignments, snap tests, participation in discussion in the class, term papers, attendance etc.
4. For reappear/improvement candidate(s), who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will be increased proportionally to maximum marks of the paper in lieu of internal assessment. **The paper setter must put note (4) in the question paper.**

LIST OF READINGS

Essential Readings:

1. Flannery, T. *The Weather Makers: The History and Future Impact of Climate Change.* Allen Lane. London, 2005.
2. Mannion, A.M.: *Natural Environmental Change.* Routledge, London, 1999.
3. Mannion, A.M.: *Global Environmental Change*, Routledge, New York, 2014.
4. Parkinson, Claire L.: *Coming Climate Crisis? Consider the past, beware the big flux.* Rowman & Littlefield Publishers, INC. Lanham, Maryland, 2010.
5. Richard W. Battarbee and Heather A.: Binney. *Natural Climate Variability and Global Warming: A Holocene Perspective.* John Wiley & Sons, 2008.
6. Romm, Joseph: *Climate Change- What Everyone Needs to Know*. 2nd Edition, Oxford University Press, USA, 2018.
7. Sarah E., I. Colin Prentice, Joanna I. House and Catherine J. Downy: *Understanding the Earth System: Global Change Science for Application.* Cambridge University Press, UK, 2012.
8. Stepardson, D.P.: Anita Roychoudhury and A.S. Hirsch. *Teaching and Learning about Climate Change- A framework for Educators*. Routledge, New York, 2017.
9. William K.: *Climate Change: A Natural Hazard.* Multi-science publishing, UK. P. 207, 2004.

Further Readings:

1. Bill Mcguire, Ian M. Mason, Ian Mason and Christopher R. J. Kilburn: *Natural Hazards and Environmental Change*. Arnold, London, 2002.
2. Crutzen, P. J.: Geology of mankind: the Anthropocene. *Nature,* 415, 23, 2002.
3. Erle C. Ellis, Kees Klein Goldewijk, Stefan Siebert, Deborah Lightman and Navin Ramankutty: Anthropogenic transformation of the biomes, 1700 to 2000. *Global Ecology and Biogeography,* 19, 589–606, 2010.
4. Kevin Anderson and Alice Bows: Beyond 'dangerous' climate change: emission scenarios for a new world. *Phil. Trans. R. Soc. A,* 369, 20–44, 2011.
5. M. G. Sanderson, D. L. Hemming and R. A. Betts. Regional temperature and precipitation changes under high-end (≥4◦C) global warming. *Phil. Trans. R. Soc. A,* 369, 85–98, 2011.
6. Will Steffen, Regina Angelina Sanderson, Peter D. Tyson, Jill Jäger, Pamela A. Matson, Berrien Moore III, Frank Oldfield, Katherine Richardson, Hans-Joachim Schellnhuber, Billie L. Turner and Robert J. Wasson: *Global Change and the Earth System: A Planet under Pressure.* Springer-Verlag Berlin Heidelberg, Germany, 2005.

PEDAGOGY: There must be interaction between teacher and students on different aspects of climate change with the help of documentaries, pictures and case studies. Discussion on contemporary issues and problems related to climate change shall be discussed with a focus on learning by doing method. The emphasis shall be climate and environmental problems faced by India in recent years.

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