



Syllabus

M.Sc. (Geography)

(w.e.f. 2014-15)

DEPARTMENT OF GEOGRAPHY

Central University of Haryana
Mahendergarh

Syllabus

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**DEPARTMENT OF GEOGRAPHY
CENTRAL UNIVERSITY OF HARYANA
MAHENDERGARH, HARYANA**



University Logo

University Logo is conceived with a globe at its centre surrounded by holy trinity of three arcs and at the bottom is a shloka taken from 'Neeti Shatkam' written by Bhartiari.

The arc at the bottom depicts an open book and a Veena, symbolising University's commitment to meeting the quest for acquiring knowledge, learning, enlightenment and promoting art and culture.

The arc at the right that depicts processes of science, technology and adventurism symbolises the University's commitment to promoting scientific progress and creating a culture of creativity, innovation and enquiring approach.

The arc at the left that depicts nature symbolises University's commitment to promoting education inculcating respect for environment, ecology and living in harmony with nature.

The globe at the centre surrounded by the human chain and the pigeon flying above expresses University's belief that commitments represented by the trinity of three arcs shall lead to global peace, prosperity and human solidarity-the real spirit of education.

The shloka at the bottom conveys that 'education' is the unrivalled treasure of all.

Vision Statement

To develop enlightened citizenship for a knowledge society for peace and prosperity of individuals, nation and the larger world through promotion of innovation, creative endeavors and scholarly inquiry

Mission Statement

- To be a leading model by defining learning, teaching and discovery in a global, national and local context
- To strive to create a learning ambience with diverse cultural backgrounds and enhance student's acquisition of useful knowledge, skills and analytical abilities through innovative teaching and holistic learning environment
- To facilitate cutting edge research in emerging areas and expanding research in traditional areas
- To progressively expand in phases academic and research areas to be pursued by the University from time to time into their diversified focuses
- To focus on relevance, quality and excellence in each area and discipline of study that University is to pursue
- To develop partnership with international and national institutions and facilitate providing international linkages for contextual and cultural learning for both faculty and students
- To involve stakeholders including Government, Industry, Community and others in providing relevant and quality education
- To create and maintain highest level of integrity, ethics and values on Campus and ensure zero tolerance for lack of these core commitments

University Objectives

- To disseminate and advance knowledge by providing instructional and research facilities in such branches of learning as it may deem fit;
- To make special provisions for integrated courses in humanities, social sciences, science and technology in its educational programmes;
- To take appropriate measures for promoting innovations in teaching-learning process and inter-disciplinary studies and research;
- To educate and train manpower for the development of the country;
- To establish linkages with industries for the promotion of science and technology; and
- To pay special attention to the improvement of the social and economic conditions and welfare of the people, their intellectual, academic and cultural development.

Central University of Haryana

The Central University of Haryana, established by MHRD, under the Central Universities Act-2009 (Act No. 25 of 2009) made a spirited beginning under the leadership of its sagacious and visionary founder Vice Chancellor Prof. Mool Chand Sharma, from a rented building in Gurgaon as transit office and Narnaul B.Ed. college building as campus. It has now shifted to its Permanent Campus sprawling over 488 acres of land at Jant-Pali Villages, Mahendergarh district of Haryana. The University, fully funded by the UGC, is all set to emerge as a seat of great learning in the Southern Haryana under the leadership of its reverent and visionary Acting Vice-Chancellor Prof. U. P. Sinha. Being at the nascent stage of establishment, the University immediately after getting possession of the land at Jant-Pali, Mahendergarh acted through various empowered Committees and Groups to chart out the course of development. After duly considering the recommendations of various empowered committees the Executive Council of the University approved the road map for the first phase of development of the campus on the site at Jant-Pali, Mahendergarh. The first phase of development comprises the construction of boundary wall and a block of four buildings. The construction of boundary wall is complete and the four blocks are functional to run the academic programmes. These blocks host separate hostels for boys and girls, modest accommodation for faculty and other staff, academic wing with class rooms, seminar rooms, tutorial rooms, laboratories, libraries, conferencing facilities, etc. These buildings will be integrated as a part of hostel zone when the development of the Campus enters in the final phase. Marching ahead on the journey of promoting grass root research and fruitful engagement with society many brainstorming sessions of idea generation are held. After comprehensive deliberations University has adopted “**Multidisciplinary Approach to Inclusive Education**” as motto.



DEPARTMENT OF GEOGRAPHY

Department of Geography, Central University of Haryana has been opened in the academic year 2014-15 by offering M.Sc. (Geography) programme. This *Department* is functioning under the School of Earth & Space Studies and is the founding department of the School along with Department of Environment Sciences. This school right now have the following departments

- Department of Environment Sciences
- Department of Geography

SCHEME OF EXAMINATION AND COURSE STRUCTURE

Department of Geography offers PG programme i.e. M.Sc. (Geography) of two years duration which are divided into four semesters & based on choice based credit system (CBCS). Each Semester shall consist of four Core papers of 4 credits each and three elective papers of 3 credits each. Practical examination shall be conducted by two examiners, internal examiner appointed by Head, Department of Geography and external examiner appointed by the Vice-Chancellor out of the panel recommended by the Board of Studies of Department of Geography. Marks of Internal assessment shall be awarded as per the laid down norms of the University. The Elective papers shall be provided by the department according to its administrative and academic convenience.



Course Structure for M.Sc. - Geography under Choice Based Credit System has been given on the next page.

Semester – I

<i>Sr. No.</i>	<i>Nomenclature</i>	<i>Course Code</i>	<i>Core/ Elective</i>	<i>Credits</i>
1	Geomorphology	SEE GEO 01 101 C 3104	Core	4
2	Climatology	SEE GEO 01 102 C 3104	Core	4
3	Population Geography	SEE GEO 01 103 C 3104	Core	4
4	Practical Geography: Interpretation of Topographical Sheets and Computer Aided Statistical Diagrams	SEE GEO 01 104 C 3104	Core	Distribution of credits 4 are: Lab work test:2 Record on lab work:1 Viva-Voce:1
Elective :				
5.	Biogeography	SEE GEO 01 101 E 2103	Elective	3
6.	Natural Resource Management	SEE GEO 01 102 E 2103	Elective	3
7.	Geography of Water Resources	SEE GEO 01 103 E 2103	Elective	3
Total Credit:				19

NOTE: Students may opt for Electives as per the requirements of the ordinance. For more details, Ordinance may be consulted.

Semester – II

<i>Sr. No.</i>	<i>Courses</i>	<i>Course Code</i>	<i>Core/ Elective</i>	<i>Credits</i>
1	Geography of India	SEE GEO 01 201 C 3104	Core	4
2	Urban Geography	SEE GEO 01 202 C 3104	Core	4
3	Quantitative Techniques in Geography	SEE GEO 01 203 C 3104	Core	4
4	Practical Geography: Field Work and Report Writing	SEE GEO 01 204 C 3104	Core	Distribution of credits 4 are: Lab work test:2 Record on lab work:1 Viva-Voce:1
Elective				
5	Agricultural Geography	SEE GEO 01 201 E 2103	Elective	3
6	Social Geography	SEE GEO 01 202 E 2103	Elective	3
7	Regional Planning & Development	SEE GEO 01 203 E 2103	Elective	3
Total Credit:				19

Semester – III

<i>Sr. No.</i>	<i>Courses</i>	<i>Course Code</i>	<i>Core/ Elective</i>	<i>Credits</i>
1	Geography of Natural Hazards and Disasters	SEE GEO 01 301 C 3104	Core	4
2	Oceanography	SEE GEO 01 302 C 3104	Core	4
3	Environmental Geography	SEE GEO 01 303 C 3104	Core	4
4	Practical Geography: Morphometric Analysis	SEE GEO 01 304 C 0044	Core	Distribution of credits 4 are: Lab work test:2 Record on lab work:1 Viva-Voce:1
Elective				
5	Geography of Tourism	SEE GEO 01 301 E 2103	Elective	3
6	Soil Geography	SEE GEO 01 302 E 2103	Elective	3
7	Remote Sensing Techniques & GIS	SEE GEO 01 303 E 2103	Elective	3
9	Course from other Department			3
10	Submission of Research Proposal			
Total Credit: 22				

Semester – IV

<i>Sr. No.</i>	<i>Courses</i>	<i>Course Code</i>	<i>Core/ Elective</i>	<i>Credits</i>
1	Geographical Thought	SEE GEO 01 401 C 3104	Core	4
2	Research Methodology	SEE GEO 01 402 C 3104	Core	4
3	Practical Geography: Interpretation of Aerial Photographs & Satellite Images and Thematic Mapping	SEE GEO 01 403 C 0044	Core	Distribution of credits 4 are: Lab work test:2 Record on lab work:1 Viva-Voce:1
3	Dissertation (including viva voce)	SEE GEO 01 404 C 0066		6
4	Course from other Department			3
Total Credit:				21
6. Self Study Course				

NOTE: Students may opt for Electives as per the requirements of the ordinance. For more details, Ordinance may be consulted.

**ORDINANCE RELATING TO PROGRAMMES
LEADING TO THE AWARD OF POST GRADUATE DEGREES / DIPLOMAS**

1. Definitions:

- 1.1 “Course” means a Semester course.
- 1.2 “Credit” (c) is the weightage assigned to a course in terms of contact hours.
- 1.3 “Grade” means a letter grade assigned to a student on the basis of evaluation of a course on a ten point scale.
- 1.4 “Grade point” (g) means the numerical equivalent of a letter grade assigned to a student in the ten point scale.
- 1.5 Semester Grade Point Average (SGPA) means the grade point average of a student for a semester calculated in the following manner:
 $SGPA = (g_1 \times c_1) + (g_2 \times c_2) + \dots$ (in respect of all courses for which the student has registered in the semester concerned) divided by the total number of credits offered by the student in the semester.
- 1.6 “Cumulative Grade Point Average” (CGPA) means a cumulative index grade point average of a student calculated in the following manner:
 $CGPA = (g_1 \times c_1) + (g_2 \times c_2) + \dots$ (in respect of all the courses for which the student has registered up to and including the semester for which the cumulative index is required) divided by the total number of credits offered by the student in the said courses.
- 1.7 “Final Grade Point Average” (FGPA) is the final index of a student at the time of award of a degree, calculated in the following manner:

$$FGPA = \frac{\sum_{i=1}^n g_i \times c_i}{\sum_{i=1}^n c_i}$$

Where $\sum_{i=1}^n c_i$

c_i = credit in the i^{th} course

g_i = grade point secured by the student in the i^{th} course

n = total number of courses prescribed for the student for the entire programme.

- 1.8 “Final Grade” is the letter equivalent assigned to a student on the basis of his/her FGPA at the time of the award of the degree.

2. Eligibility for admission:

A candidate may be admitted to the Master’s programme if he/she has obtained a Bachelor’s degree under 10+2+3 system recognized by the University, or a degree recognized as its equivalent, provided such a candidate has attained the minimum proficiency in the subject at the time of admission as decided by the University from time to time.

3. Semesters:

3.1 An academic year shall consist of two semesters, viz.:Odd semester and Even semester.

3.2 Ordinarily an Odd semester shall extend from July to December, and an Even semester from January to May.

3.3 A semester normally extends over a period of 15 weeks, each week having 30 hours of instruction spread over a week.

4. Type of courses:

Each programme may have three types of courses, viz. core courses, elective courses and self-study-courses.

4.1. Core courses:

4.1.1 Core courses are those, knowledge of which is deemed essential for students registered for a particular Master's programme. Where feasible and necessary, two or more programmes may prescribe one or more common core courses.

4.1.2 Core courses shall be mandatory for all students registered for that Master's programme.

4.1.3 Core courses shall be spread over all the semesters of the programme.

4.2 Elective courses:

Elective courses are intended to:

- allow students to specialize in one or more branches of the broad subject area; or
- acquire knowledge and skills in a related area that may have applications in the broad subject area; or
- bridge any gap in the curriculum and enable acquisition of essential skills (e.g. statistical, computational, language, communication skills, etc.); or
- help pursue an area of interest to the student.

4.3 Self-study courses:

4.3.1 Self-study courses are optional, not mandatory. They are not taken into account for awarding grades.

4.3.2 Students may also choose 3 additional courses to enable them to acquire extra credits through self-study.

4.3.3 Self-study courses shall be in advanced topics in a course (core or elective) under the supervision of a faculty member.

Note: A course (Core/Elective/Self-study) may also take the form of a Dissertation/ Project work/ Practical training/ Field work/ Internship/ Seminar, etc.

5. Credits:

Credit defines the quantum of contents/syllabus prescribed for a course and determines the number of hours of instruction required per week. Thus, in each course, credits are assigned on the basis of the number of lectures/tutorials/laboratory work/field work and other forms of learning required completing the contents in a 15 week schedule. 2 hours of laboratory work/field work is generally considered equivalent to 1 hour of lecture.

- 1 credit = 1 hour of instruction per week (1 credit course = 15 hours of instruction per semester)

- 3 credits = 3 hours of instruction per week (3 credit course = 45 hours of instruction per week)

A Core course may carry 3 to 4 credits; an elective/ Self-study will not normally carry more than 3 credits. However, a dissertation/ project work may carry up to 6 credits; a semester-long field work may carry 10-15 credits.

6. Auditing:

Students may be permitted by the individual faculty member at his/her discretion to audit two courses without assigning any credits.

7. Course numbering:

Each course offered by a faculty/department is identified by a unique course code: e.g. SSS C 001 Eco 3003, where

- SSS stands for School of Social Sciences;
- C stands for core course;
- 001 stands for the serial number of the course;
- The figures 3,0,0,3 stand for credits attached to lectures (practical, if it is a practical course), tutorials, practical work (theory, if it is a practical course) and total number of credits for the course respectively.

8. Duration of programme:

The minimum duration for completion of a one-year Post Graduate Diploma programme shall be two consecutive semesters (one odd and one even semester), for a two-year Master's programme in any subject shall be four consecutive semesters (two odd and two even semesters) and for a three-year Master's programme - six semesters, i.e. three odd and three even semesters. The maximum period for completion shall be four semesters, six semesters and eight semesters respectively.

Provided that a semester or a year may be declared by the Academic Council zero semester or zero year in the case of a student if he/she could not continue with the academic work during that period due to illness and hospitalization, or due to accepting a foreign scholarship/fellowship, subject to fulfillment of requirements laid down in this respect by regulations. Such zero semester/year shall not be counted for calculation of the duration of the programme in case of such a student.

9. Student Advisor:

The Department in which the student gets admitted shall appoint an Advisor for him/her from amongst the members of the faculty concerned. All faculty members of the department shall function as Student Advisors and shall have more or less equal number of students. The Student Advisor shall advise the student in choosing courses and render all possible help to the student.

10. Course Registration:

- 10.1 Registration of courses is the sole responsibility of a student. No student shall be allowed to do a course without registration, and no student shall be entitled to any credits in the course unless he/she has been formally registered for the course by the scheduled date fixed by the University.

- 10.2 Every student has to register in each semester (in consultation with his/her Student Advisor) for the courses he/she intends to undergo in that semester by applying in the prescribed proforma in triplicate, duly signed by him/her, the Student Advisor and the Head of the Department, within the deadline notified for the purpose by the University.
- 10.3 Late registration may be permitted by the Dean of the faculty upto a maximum of two weeks after the commencement of the semester on payment of prescribed late registration fee.
- 10.4 A student shall register for a minimum of 15 credits and can register for a maximum of 24 credits in a semester.
- 10.5 Withdrawal from a course shall be permitted up to one week from the date of registration, provided the courses registered after withdrawal shall enable the student to earn a minimum of 15 credits. Withdrawal from a course shall not be allowed for those who had late registration.
- 10.6 A student shall be allowed to add a course or substitute a course for another course of the same type (core, elective or self study) for valid reasons with the consent of the Student Advisor not later than two weeks from the date of commencement of the semester.
- 10.7 A student may take more elective courses than prescribed in the programme, in which case in the calculation of the Semester/ Cumulative/ Final Grade Point Average only the prescribed number of elective courses in the descending order of the grades obtained by him/her shall be included.

11. Evaluation & examination:

- 11.1 Sessional evaluation shall be done on a continuous basis, taking into account the student's class performance, fulfillment of home assignments and performance at the compulsory sessional tests (2 best out of 3 tests to be conducted in a semester). For uniformity, particularly for interdepartmental transfer of credits, there shall be a uniform procedure of examination to be adopted by all faculty members. There shall be three sessional tests and one end-semester examination in each course during every semester.
- 11.2 Sessional Test 1 shall be held during the sixth week of the semester for the syllabi covered till then.
- 11.3 Sessional Test 2 shall be held during the eleventh week for the syllabi covered between seventh and eleventh week.
- 11.4 Sessional test 3 shall be held during the fourteenth week of the semester for the remaining syllabus after the sessional test 2.
- 11.5 Sessional tests may employ one or more assessment tools such as objective tests, assignments, paper presentation, laboratory work, etc. suitable to the course.
- 11.6 The pattern of assessment of sessional work, including the weightages to be given to different elements like class performance, home assignments and the sessional tests, for each course shall be prescribed by the School Board on the recommendation of the Board of Studies of the Department concerned and shall be made known to the students at the commencement of each semester.

- 11.7 A student cannot repeat sessional tests.
- 11.8 The sessional work and the end semester examination shall have equal weightage i.e. 50% each. The 50% weightage allotted to sessional work shall consist of 30% for class performance and home assignments and the remaining 20% for the two compulsory sessional tests (i.e. 10% each), or 20% for class performance and home assignments and 30% for the two sessional tests, depending upon the nature of the course.
- 11.9 A student clears the sessional work in a course if he / she has participated in the sessional work and secured a grade higher than F in it.
- 11.10 End semester Examinations covering the entire syllabus prescribed for the course and carrying 50% of weightage shall be conducted under the direction of the Dean of the School.
- 11.11 Examiners or Board of Examiners shall be appointed for each course by the School Board on the recommendation of the Board of Studies of the Department concerned.
- 11.12 The distribution of weightage for the valuation of semester-long project work/ dissertation shall be:
- i) Periodic presentation : 20%
 - ii) Concise dissertation : 60%
 - iii) Viva voce : 20%
- Or as decided by the School Board on the recommendations of the Board of Studies of the Department concerned.
- 11.13 An application for admission to the semester examination shall be made in the prescribed form and forwarded to the Dean of the School through the HOD concerned and shall be accompanied by the following documents:
- i) Clearance in sessional evaluation;
 - ii) Clearance of all dues.

12. Grades and Grade points:

The students shall be graded in sessional tests, end semester examinations, etc. in each course on the following ten point scale:

Grade	Grade Point
A+	9.00
A	8.25
A-	7.50
B+	6.75
B	6.00
B-	5.25
C+	4.50
C	3.75
C-	3.00
F	0

Note:

1. There shall be no rounding of SGPA/CGPA/FGPA.
2. The SGPA/CGPA/FGPA obtained by a student is out of a maximum possible 9 points. The Final Grade Point Average obtained by a student shall be classified into the following divisions:

FGPA	Class/ Division
8.5 and above	First Class with Distinction
7.0 and above, but less than 8.5	First Class
5.0 and above, but less than 7.0	Second Class
4.0 and above, but less than 5.0	Pass

13. Credit requirements:

- 13.1 For a one-year Post Graduate programme, the credit requirements for the award of the Post Graduate Diploma shall be 40 credits ($\pm 10\%$), including a minimum of 9 credits from elective courses (of which at least 3 credits shall be from elective course offered by another Department).
- 13.2 For a two-year Master's programme, the credit requirements for the Master's degree shall be 80 credits ($\pm 10\%$), including a minimum of 18 credits from elective courses (**of which at least 6 credits shall be from elective courses offered by other Departments**).
- 13.3 For a three-year Master's programme, the credit requirements for the Master's degree shall be 120 credits ($\pm 10\%$), including 27 credits from elective courses (of which 9 credits shall be from elective courses offered by other Departments).

14 Grade point requirements:

A student in order to be eligible for the award of the Master's degree of the University must have fulfilled the following requirements:

- i) He/she has taken and passed all the prescribed courses as laid down;
- ii) He/she has obtained a FGPA of 4.00 at the end of the programme.

Provided that students who are otherwise eligible for the award of the degree / diploma but have secured a FGPA less than 4.00 at the end of the permissible period of semesters may be allowed by the Department / School concerned to repeat the same course/s or other courses of the same type in lieu thereof in the two extra semesters provided in clause 8 on "Duration of Programme".

15 Removal of name of a student from the programme:

- a. The name of a student falling under the following categories shall automatically stand removed from the rolls of the University:
 - (a) A student who fails to fulfill the minimum grade point requirements under clause 14.
 - (b) A student who has already exhausted the maximum duration allowed for completion of the Programme and has not fulfilled the requirements for the award of the degree / diploma.
- b. The School Board, on the recommendation of the Board of Studies of the Department concerned, may remove the name of a student from the programme of study if
 - (a) he / she fails to clear at least 50% of the prescribed core courses at the end of the 1st semester.
 - (b) he / she has still to clear courses which cannot possibly be cleared in the remaining period of the programme which he/ she is allowed to register for the normal load in the said period.

Notwithstanding what is contained in the foregoing clauses of this Ordinance, the Academic Council may, in exceptional circumstances and on the recommendations of the Board of Studies of the Department and the School Board as well as on the merits of each individual case, consider at its discretion and for reasons to be recorded relaxation of any of the provisions except those prescribing CGPA / FGPA requirements.

**M.Sc. (Geography)
SEMESTER-I**

Paper-101C: Geomorphology

UNIT-I

Geomorphology - Definition, Nature and Scope of Geomorphology; History and development of geomorphic ideas; Fundamental concepts - uniformitarianism, geological structure and landforms, multicyclic and polygenetic evolution of landscapes;
The Earth's interior - structure and constitution, Recent Views. Plate Tectonics: meaning and concept, plates, plate margins and boundaries, plate motion, tectonic activities along the boundaries, and distribution of plates; Isostasy.

UNIT-II

Earth movements - epeirogenic, orogenic and cymatogenic earth movements; Endogenetic processes –folding, faulting, and their geomorphic expressions; Earthquake - concept, causes, classification, intensity and magnitude, and geographical distribution; Vulcanism - concept, mechanism and causes; Volcanoes- classification, volcanic materials; Topography associated with vulcanicity and geographical distribution.

UNIT-III

Exogenetic Processes: weathering and mass movement - meaning and concept, controlling factors, classification and significance.
Dynamics of fluvial, glacial, aeolian, marine, and karst processes and resulting landforms' complexities in geomorphological processes. Slope evolution -downwearing, parallel retreat and slope replacement models.

UNIT-IV

Applied Geomorphology – meaning and applications of Geomorphology in Regional Planning, engineering projects, mineral exploration; hydro-geomorphology, urban geomorphology, environmental geomorphology, geomorphic hazards.
Regional Geomorphology of Punjab plain, Aravalli Region and Thar desert of India.

Recommended Readings :

1. Bloom, A.L. (1992), *Geomorphology*, Second Edition, Prentice Hall of India, New Delhi.
2. Chorley, R.J.(1972), *Spatial Analysis in Geomorphology*, Methuen, London.
3. Cooke, R.U. and Doornkamp, J.C. (1974), *Geomorphology in Environmental Management—An Introduction*, Clarendon Press, Oxford.
4. Dayal, P. (1990), *A Text Book of Geomorphology*, Shukla Book Depot, Patna.
5. Dury, G.H. (1959), *The Face of the Earth*, Penguin Harmondsworth.
6. Fairbridge, R.W. (1968), *Encyclopedia of Geomorphology*, Reinholdts, New York.
7. Garner, H.F. (1974), *The Origin of landscape-A Synthesis of Geomorphology*, Oxford University Press, London.
8. Goudie, A. (1993), *The Nature of the Environment*, Oxford & Blackwell, London.
9. Husain, Majid (2002), *Fundamentals of Physical Geography*, Second Edition, Rawat Publications, Jaipur and New Delhi.

10. McKnight, Tom L. (1987), *Physical Geography: A Landscape Appreciation*, Second Edition, Prentice Hall, Inc., Englewood Cliffs, N.J.
11. Olliver, C.D.(1979),*Weathering*, Longman, London.
12. Pitty, A.F. (1971), *Introduction to Geomorphology*, Methuen, London.
13. Sharma, H.S. (ed.) (1980), *Perspectives in Geomorphology*, Concept, New Delhi.
14. Singh, Savindra (1993), *Physical Geography*, Prayag Pustak Bhawan, Allahabad.
15. Singh, Savindra (1998), *Geomorphology*, Prayag Pustak Bhawan, Allahabad.
16. Skinner, B.J. & Porter, S.C.(1995),*The Dynamic Earth*, John Wiley, New York.
17. Sparks, B.W. (1960), *Geomorphology*, Longman, London.
18. Stoddart, D.R.(ed.) (1996), *Process and Form in Geomorphology*, Routledge, New York.
19. Strahler, A .N. (1988), *Earth Sciences*, Harper and Row Publishers, N.D.
20. Strahler, A.H. and Strahler, A.N.(2006), *Modern Physical Geography*, Fourth Edition, Willey-India, New Delhi.
21. Thornbury, W.D. (1991), *Principles of Geomorphology*, (Indian Reprint), John Wiley, New Delhi
22. Wooldridge, S. W and Morgan, R.S. (1991), *An Outline of Geomorphology*, Orient Longmans, Calcutta.

Paper-102C: Climatology

UNIT-I

Nature and scope of climatology and its relationship with meteorology; Atmosphere-Composition and structure; Basic processes in heating and cooling the atmosphere; Insolation-factors affecting insolation and insolation heat balance of the earth; Temperature -vertical and horizontal distribution.

Atmospheric motion: Forces controlling motion of air - vertical motion and vorticity, local winds, jet stream, general circulation in the atmosphere.

UNIT-II

Air pressure; Atmospheric moisture: Humidity, evaporation, condensation, precipitation: formation, types and world pattern of precipitation.

UNIT-III

Tropical, temperate and high latitude weather systems - air masses, fronts, cyclones, tornadoes; Ocean atmospheric interaction- El Nino, ENSO, La Nina and Monsoon winds.

Tropical-Temperate phenomena; Climate of India and its controls: Western disturbances.

UNIT-IV

Climatic classification of Koppen, Thornthwaite and Trewartha.

Major climates of the world-tropical, temperate, desert and mountain climate.

UNIT-V

Global climatic changes - evidences, and possible causes; greenhouse effect; global warming - environmental impacts and society's response; acid rain and its problems.

Applied climatology: Data collection, archiving, accessing, interpretation and generation of climatic information specially for water balance studies, soils, agriculture activities, house types and health; urban climate.

Recommended Readings :

1. Barry, R.G. and Chouly, R.J. (1998), **Atmosphere, Weather and Climate**, ELBS, Methuen & Co. Ltd. London and New York.
2. Bhutani Smita, (2000), **Our Atmosphere**, Kalyani Publishers, New Delhi.
3. Critchfield, J. H. (1993), **General Climatology**, Prentice Hall of India, New Delhi.
4. Das, P.K. (1987), **Monsoons**, National Book Trust, New Delhi.
5. Fein, J.S. and Stephens, P.N.(1987), **Monsoons**, Wiley Interscience.
6. Griffith, J.F. and Driscoll, D.M. (1982) **Survey of Climatology**, Charles Merrill.
7. India Met. Deptt. (1968), **Climatological Tables of Observatories in India**, Govt. of India.
8. Lal, D.S. (2010), **Fundamentals of Climatology**, Third Edition, Chaitanya Publishing House, Allahabad.
9. Lydolph, P.E. (1985), **The Climate of the Earth**, Rowman.
10. Menon, P.A. (1989), **Our Weather**, N.B.T., New Delhi.

11. Peterson, S. (1969), *Introduction to Meteorology*, McGraw Hill Book, London.
12. Riehl, H. (1968), *Introduction to Atmosphere*, McGraw Hill, New York.
13. Robinson, P.J. and Henderson Sellers (1986), *Contemporary Climatology*, Longman, London.
14. Thompson, R.D. and Perry, A. (ed.) (1997), *Applied Climatology: Principles and Practice*, Routledge, London.
15. Trewartha, G.T. (Latest edition), *Introduction to Climate*, McGraw Hill, New York.

Paper-103C: Population Geography

UNIT-I

Population Geography: Definition, nature and scope and objectives; Development of Population Geography as a field of specialization; Relationship of Population Geography with other disciplines – demography and population studies; Sources of population data with particular reference to India – census, vital or civil registration system, Sample Registration System, Sample surveys with particular reference to NSSO and NFHS; Population data and their level of reliability; Problems of comparability and mapping of population data.

UNIT-II

World population distribution, density and growth; Factors affecting population distribution; Population growth - trends and determinants;

India: population distribution, density and growth profile; Concepts of under-population and over-population.

Theories of population growth – pre-Malthusian views, Malthus' Theory, views of socialist writers, optimum population theory, demographic transition model.

UNIT-III

Population composition: age and sex; family and households; literacy and education; religion, caste and tribes; rural and urban; occupational structure; Population composition of India.

Population dynamics: measurements of fertility and mortality; trends and patterns in fertility and mortality levels; migration: national and international patterns; India's population dynamics.

Migration: national and international patterns; features of internal migration in India; theories of migration; Urbanisation- trends and patterns.

UNIT-IV

Population and development: population- resource regions and levels of population and socio-economic development; population policies in developed and less developed countries; Human Development Index and its components; India's population policies; population and environment; implications for the future.

Recommended Readings:

1. Beaujen- Garnier, J. (1966), *Geography of Population*, Longman, London.
2. Bhende, Asha and Kanitkar, Tara (2006), *Principles of Population Studies*, 18th Edition, Himalaya Publishing House, Mumbai.
3. Bilasborrow, Richard E. and Daniel Hogan (1999), *Population and Deforestation in the Humid Tropics*, International Union for the Scientific Study of Population, Belgium.
4. Bogue, D.J. (1969), *Principles in Demography*, John Wiley, New York.
5. Bose, Ashish *et al.* (1974), *Population in India's Development (1947-2000)*, Vikas Publishing House, New Delhi.
6. Chandana, R.C. (2008) *Geography of Population: Concepts, Determination and Patterns*, Seventh Edition, Kalyani Publishers, New Delhi.

7. Clarke, J.I. (1992), *Population Geography*, Second Edition, Pergamon Press, Oxford England.
8. Crook, Nigel (1997), *Principles of Population and Development*, Pergamon Press, New York.
9. Daugherty, Helen Gin, Kenneth C.W. Kammeyir (1998), *An Introduction to Population* (Second Edition), The Guilford Press, New York, London.
10. Garnier, B.J. (1970), *Geography of Population*, Longman, London.
11. Mamoria C.B. (1981), *India's Population Problems*, Kitab Mahal, New Delhi.
12. Mitra, Asok (1978), *India's Population: Aspects of Quality and Control*. Vols. I&II, Abhinav Publications, New Delhi.
13. Premi M.K. (1991), *India's Population: Heading Towards a Billion*, B.R. Publishing Corporation, New Delhi.
14. Sangwan, Sneha and Sangwan, R.S. (2003), *Rural–Urban Divide : Changing Spatial Pattern of Social Variables*. Concept Publishing Company Pvt. Ltd., New Delhi.
15. Sangwan, Sneha; Dabas, Anju and Sangwan, R.S. (2011), *Urban-Rural Disparity in Literacy*, Concept Publishing Company Pvt. Ltd., New Delhi.
16. Sangwan, Sneha; Sangwan, R.S. and Mahima (2012), *Gender Bias, Missing Girls and Population Imbalance: Regional Concerns and Strategies*, Concept Publishing Company Pvt. Ltd., New Delhi.

PAPER-104C: PRACTICAL GEOGRAPHY

TOPOSHEET INTERPRETATION AND COMPUTER AIDED STATISTICAL DIAGRAMS

UNIT-I

Toposheet Interpretation :Numbering and nomenclature of Toposheets in India; Topographical sheet interpretation, Basic information on Topographical sheets, Preliminary information, Conventional Signs, Interpretation of Relief, Drainage, Settlements, Land-use, Vegetation and Transport network on Toposheets (at least 12 Exercises).Availability and acquisition of toposheets in India.

UNIT - II

Introduction to computer: Components of Computer - Hardware and Software);The process of writing of data disks (e.g. Census of Indian data disks) Use of Computers in Geography. Introduction to MS - Excel : Drawing of line graph, Bar Diagram, Pie diagram, Scatter diagram, (changes from colour to different shade patterns, placement of Legend, different weight to X and Y coordinates, Placement of Headings and Sub-headings, Font Size, Style, Bold and Italics.

Recommended Readings:

1. Ishtiaq, M. (1989), *Practical Geography*, Heritage Publishers, New Delhi.
2. Khan, Md. Z.A. (1998), *Text Book of Practical Geography*, Concept publishing Co. Pvt. Ltd., New Delhi.
3. Khullar, D.R. (2001), *Essentials of Practical Geography*, Second Edition, New Academic Publishing Co., Jalandhar.
4. Misra, R.P. and Ramesh, A. (1989), *Fundamentals of Cartography*, Revised and Enlarged Edition, Concept Publishing Co., New Delhi.
5. Monkhouse, F.J. (1971), *Maps and Diagrams*, Methuen.
6. Punmia, B.C. (1981), *Surveying*, Standard Book House, New Delhi.
7. Robinson, Arthur H. *et al.* (2004), *Elements of Cartography*, Sixth Edition, Wiley-India, New Delhi.
8. Sarkar, Ashis (2008), *Practical Geography: A Systematic Approach*, Orient Blackswan Pvt. Ltd., Kolkata.
9. Sharma, J.P. (1996), *Prayogik Bhoogol*, Restogi Publications, Meerut.
10. Singh, R.L. (1979), *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
11. Yadav, H.L. (2002), *Prayogatamak Bhoogol Ke Aadhar (Fundamentals of Practical Geography)*, Radha Publications, New Delhi.

PAPER-105E: BIOGEOGRAPHY

Unit-I

Biogeography – Development and scope; Biosphere - definition, nature and composition; Environment, Habitat and Plant-animal association.

Unit-II

Biogeochemical cycles- the hydrological cycle, the carbon cycle, the oxygen cycle, the nitrogen cycle, the phosphorous cycle and the sediment cycle.

Elements of plant geography, distribution of forests and major communities; Plant successions in newly formed landforms; Examples from flood plains and glacialfore fields; National Forest Policy of India; Conservation of Biotic Resources.

Unit-III

Ecosystem - Meaning, types, components and functioning of ecosystem; Evolution of living organism and factors influencing their distribution on the earth; Biomes- Meaning and types.

Unit-IV

Bio-geographical realms: Zoogeography and Zoogeographical realms; Zoogeography and its Environmental Relationship; Palaeobotanical and Palaeo climatological records of environmental change in India.

Recommended Readings:

1. Agarwal, D.P. (1992), *Man and Environment in India Through Ages*, Book & Books.
2. Bradshaw, M.J. (1979), *Earth and Living Planet*, ELBS, London.
3. Cox. C.D. and Moore, P.D. (1993), *Biogeography: An Ecological and Evolutionary Approach* (Fifth Edition), Blackwell.
4. Gaur, R. (1987), *Environment and Ecology of Early Man in Northern India*, R.B. Publication Corporation, New Delhi.
5. Hoyt, J.B. (1992), *Man and the Earth*, Prentice Hall, U.S.A.
6. Huggett, R.J. (1998), *Fundamentals of Biogeography*, Routledge, U.S.A.
7. Illics, J. (1974), *Introduction to Zoogeography*, Mcmillian, London.
8. Khoshoo, T.N. and Sharma, M. (eds.) (1991), *Indian Geosphere-Biosphere*, Har-Anand Publication, Delhi.
9. Lapedes, D.N. (ed.) (1974), *Encyclopedia of Environmental Science*, McGraw Hill.
10. Mathur, H.S. (1998), *Essentials of Biogeography*, Anuj Printers, Jaipur.
11. Pears, N. (1985), *Basic Biogeography*. 2nd ed. Longman, London.
12. Simmon. I.G.(1974), *Biogeography, Natural and Cultural*, Longman, London.
13. Tivy, J. (1992), *Biogeography: A Study of Plants in Ecosphere*, 3rd Edition. Oliver and Boyd, U.S.A.

Paper-106E : NATURAL RESOURCES MANAGEMENT

UNIT-I

Introduction: Concept, models and approaches to natural resource management; problems of resource utilization; population pressure, development and resource use; natural hazards and risk management.

Models of Natural Resources Process: Zimmermann's Primitive and Advance Models of natural resource process, Kirk's Decision Model, Brookfield System Model.

UNIT-II

Definition and concept of Resources, Classification of Resources. Use and misuse of Resources: Global and Indian scenario; historical background and future prospects of various resources; soil, water, minerals, forests.

UNIT-III

Conservation and management of resources: Meaning, principles, philosophy and approaches to conservation; resource conservation and management methods; Problems of Natural Resource Management in India.

UNIT-IV

Resource appraisal and policy making: appraisal of Land resources, geophysical, geochemical, geo-botanical ; use of GIS and remote sensing in resource appraisal; institutional arrangements and policy models towards better management and conservation of resources.

Resource Development: Sustainable resource management concept, methods, dimension and sustainable system; integrated resource development and its application.

Recommended Readings:

1. Adams, W.M. (1990), *Green Development: Environment and Sustainability in the Third World*, Routledge & Chapman Hall, New York.
2. Borton, I. and R.W. Kates. (1984), *Readings in Resource Management and Conservation*, University of Chicago Press, Chicago.
3. Bruce, Mitchell (1989), *Geography and Resource Analysis*, John Wiley and Son, New York.
4. Eliot Hurst, M.E. (1972), *A Geography of Economic Behaviour : An Introduction*, Duxbury Press, California.
5. Granfelt, T.R. (1999), *Managing the Globalized Environment*, J. & L. Composition Ltd, New York.
6. Guha, J.L. and P.R. Chattoraj (1994), *Economic Geography- A Study of Resources*, The World Press Pvt. Ltd. Calcutta.
7. Holechek, J.L. *et al.* (2000), *Natural Resources: Eulogy Economics & Policy*, Prentice Hall, New Jersey.
8. Hooja, R. & Joshi, R. (1994), *Desert, Drought and Development, Studies in Resource Management and Sustainability*, Rawat Publication, Jaipur.

9. Howard, M.C. (ed.) (1993), *Asia's Environmental Crisis*, Westview Press, Prouldar.
10. Kates, R.W. & Burton, I. (eds) (1986), *Geography, Resources and Environment*, Vols. I & II, University of Chicago Press, Chicago.
11. Martino, R.L. (1969), *Resource Management*, McGraw Hill Book Co., London.
12. McLaren, D.J. and Skinnet, B.J. (eds.) (1986), *Resources and World Development*, John Wiley & Sons, New York.
13. Negi, B.S. (2000), *Geography of Resources*, Kedar Nath and Ram Nath, Meerut
14. Newson, M.D. (1991), *Land, Water & Development: River Basin Systems & Management*, Routledge London.
15. Owen, Oliver, S. (1971), *Natural Resource Conservation: An Ecological Approach*, McMillan, New Delhi.
16. Owen, S. & Owens, P. L. (1991), *Environment Resources & Conservation*, Cambridge University Press, New York.
17. Peckford, John *et al.* (ed.) (1994), *Water, Sanitation, Environment & Development*, IT Publication, London.
18. Raja, M. (1989), *Renewable Resources, Development*, Concept Pub. New Delhi.
19. Ramesh, A. (1984), "Resource Geography" in Misra, R.P. (Ed.), *Contribution to Indian Geography*, Vol. Heritage Publishers, New Delhi.
20. Redclift, M. (1987), *Sustainable Development: Exploring the Contradiction*, Methuen, London.
21. Rees, J. (1988), *Natural Resources: Allocation, Economics and Policy*, Methuen, London.
22. Simmons, I. G. (1991), *Earth, Air & Water: Resources and Environment in Late 20th Century*, Edward Arnold, New York.
23. Singh, A. and Raja, M. (1982), *Geography of Resources and Conservation* (Hindi Edition) Pargati Parkashan, Meerut.
24. Thoman, Alan *et al.* (2001), *Environmental Policies & NGO Influence*, Routledge, London.
25. Zimmermann, E. W. (1951), *World Resources and Industries*, Harper and Brothers, New Delhi.

PAPER-107E: GEOGRAPHY OF WATER RESOURCES

Unit-I

Water as a focus of geographical interest, inventory and distribution of world's water resources (surface and subsurface); Basic hydrological cycle and its components- precipitation, potential evapotranspiration, interception losses; runoff; Factors affecting water resources development – climatic factors, physiographic factors, geological factors.

Unit-II

Water demand and use: methods of estimation — agricultural, industrial and municipal uses of water. Agricultural use of water: estimation of crop —water requirement; soil-water- crop relationships; water balance and drought; major and minor irrigation: methods of distribution of water to farms; water harvesting techniques, soil water conservation.

Irrigation - water logging; salinity and alkalinity of soil - over exploitation of groundwater; land subsidence; saline water intrusion into the coastal aquifers; Water quality parameters; water pollution-river and ground water-fluoride and arsenic.

Unit-III

Industrial use of water: methods of estimation; demand for water in the industrial sector of India. Municipal use of water: general trends in water supply to the urban and rural communities in India, Internal navigation, hydel power and recreation.

Unit-IV

Problems of water resource management; Floods - magnitude/frequency, structural and non-structural adjustment of flood hazards; embankments, reservoirs, channel improvement, soil conservation, afforestation, flood forecasting, evacuation, floodplains; land use regulation and insurance. Case studies of major floods. Droughts - occurrence, major drought management.

Conservation and planning for the development of water resources-social and institutional considerations; integrated basin planning; conjunctive use of surface and groundwater resources; watershed management; international and inter-state river water disputes and treaties; some case studies.

Recommended Readings:

1. Agarwal, Anil and Narain, Sunita (1997), *Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System*. Centre for Science and Environment, New Delhi.
2. Andrew A. Dzurik, (2002), *Water Resources Planning*, Rowman & Littlefield Publishers, Inc., Savage, Maryland.
3. Cech, T.V. (2005), *Principles of Water Resources : History, Development, Management and Policy*, John Wiley & Sons, Hoboken.
4. Chorley, R.J. (1979), *Water, Earth and Man*, Methuen, London.

5. Daniel P. Loucks and Beek, E.V. (2005), *Water Resources Systems Planning and Management : An introduction to Methods, Models and Applications*, UNESCO Publishing.
6. Dingman, S.L. (2002), *Physical Hydrology*, Prentice-Hall Inc., New Jersey.
7. Economic and Social Commission for Asia and the Pacific (1989), *United Nations' Guidelines for the Preparation of National Master Water Plans*.
8. Govt. of India, Ministry of Agriculture (1972), *Report of the Irrigation Commission*, Vols. I to IV, New Delhi.
9. Govt. of India, Ministry of Energy and Irrigation (1980), *Rashtriya Barh Ayog Report-National Commission on Floods*. Vols. I & II, New Delhi.
10. Gulhati, N.D. (1972), *Development of Inter-State Rivers: Law and Practice in India*, Allied Publisher, Bombay.
11. International Water Resource Association and Central Board of Irrigation & Power (1975), *Water for Human Needs*, Vols. I to V, Proceedings of the Second World Congress on Water Resources, 12-16 December, New Delhi.
12. Jones, J.A. (1997), *Global Hydrology: Processes, Resources and Environmental Management*, Longman.
13. Kates, R.W. and Burton, I. (ed.) (1980), *Geography, Resources and Environment*, Ottawa.
14. Krutilla, John V. and Eckstein, O. (1958), *Multiple Purpose River Development: Studies in Applied Economic Analysis*, John Hopkin's Press, Boston.
15. Law. B.C. (ed.) (1968), *Mountains and Rivers of India*, IGU National Committee for Geography, Calcutta.
16. Matter, J.R. (1984), *Water Resources Distribution, Use and Management*, John Wiley, Marylane.
17. Michael. A.M. (1978), *Irrigation: Theory and Practices*, Vikas Publishing House Pvt. Ltd., New Delhi.
18. Neil S. Grigg (1996), *Water Resources Management*, McGraw-Hill Book Co., New York.
19. Newson, M. (1992), *Land, Water and Development: River Basin Systems and their Sustainable Management*, Routledge, London.
20. Pereira, H.C. (1973), *Land Use and Water Resources*, Cambridge University Press, Cambridge.
21. Rao, K.L. (1979), *India's Water Wealth*, Orient Longman, New Delhi.
22. Singh, R.A. and Singh, S.R. (1979), *Water Management: Principles and Practices*, Tara Publication, Varanasi.
23. Smith, K. (1972), *Water in Britain : A Study in Applied Hydrology and Resource Geography*, McMillan, London.
24. Tebbutt, T.H.Y. (ed.) (1985), *Advances in Water Engineering*, Elsevier Applied Science Pub., London.
25. Tideman, E.M. (1996), *Watershed Management: Guidelines for Indian Conditions*, Omega, New Delhi.
26. Todd, D.K. (1959), *Ground Water Hydrology*, John Wiley, New York.

27. U.S.D.A. (1955), *The Year Book of Agriculture: Water*, Oxford and I.B.H. Publishing Co., New Delhi.
28. Verghese, B.G. (1990), *Water of Hope: Integrated Water Resource Development and Regional Co-operation within the Himalayan-Ganga-Brahmaputra-Barak Basin*, Oxford & IBH, New Delhi
29. White, G.F.L. (1977), *Environmental Effects of Complex River Development*, Westriver Press, Boulder, Colorado.

**M.Sc. (Geography)
SEMESTER–II**

Paper 201C: Geography of India

Unit-1

Physical Setting: Space relationship of India with neighboring countries; Structure and relief; Drainage system and watersheds; Physiographic regions; Mechanism of Indian monsoons and rainfall patterns, Tropical cyclones and western disturbances; Floods and droughts; Climatic regions; Natural vegetation; Soil types and their distributions.

Unit-II

Resources: Land, surface and groundwater, energy, minerals, biotic and marine resources; Forest and wild life resources and their conservation.

Agriculture: Green revolution and its socio-economic and ecological implications; Agro and social-forestry; Dry farming and its significance; Livestock resources and white revolution; aqua - culture; sericulture, apiculture and poultry; Agricultural regionalization; agro-climatic zones; agro- ecological regions.

Unit-III

Industry: Locational factors of cotton, jute, textile, iron and steel, aluminium, fertilizer, paper, chemical and pharmaceutical, automobile, cottage and agro-based industries; Industrial regionalization; New industrial policies; Special Economic Zones; Tourism including eco-tourism.

Transport, Communication and Trade: Road, railway, waterway, airway and pipeline networks and their complementary roles in regional development; Growing importance of ports on national and foreign trade; Developments in communication and information technology and their impacts on economy and society; Indian space programmes.

Unit-IV

Demographic Scenario: Growth, distribution and density of population; Demographic attributes: sex-ratio, age structure, literacy rate, work-force, dependency ratio, longevity; migration (inter-regional, intra-regional and international) and associated problems; Demographic dividend: Recent trends in demographic transition; Population problems and policies.

Contemporary Issues: Ecological issues: environmental hazards: landslides, earthquakes, tsunamis, floods and droughts, epidemics; Issues relating to environmental pollution; Principles of environmental impact assessment and environmental management; Population explosion and food security; Environmental degradation; Deforestation, Desertification and Soil erosion; Regional disparities in economic development; Concept of sustainable growth and development; Environmental awareness; Linkage of rivers; Globalization and Indian economy.

Recommended Books:

1. Centre for Science & Environment (1988), *State of India's, Environment*, New Delhi.

2. Deshpande, C.D. (1992), *India: A Regional Interpretation*, ICSSR & Northern Book Centre.
3. Dreze, Jean & Amartya Sen (ed.) (1996), *India's Economic Development and Social Opportunity*, Oxford University Press, New Delhi.
4. Gautam, Alka (2009), *Advanced Geography of India*, Second Edition, Sharda Pustak Bhawan, Allahabad.
5. Husain, Majid (2008), *Geography of India*, Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
6. Khullar, D.R. (2006), *India: A Comprehensive Geography*, Kalyani Publishers, New Delhi.
7. Kundu A. and Raza, Moonis (1982), *Indian Economy: The Regional Dimension*. Spectrum Publishers, New Delhi.
8. Robinson, Francis (1989), *The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives*, Cambridge University Press, London.
9. Singh R.L. (ed.) (1971), *India-A Regional Geography*, National Geographical Society, India, Varanasi.
10. Spate, OHK & Learmonth, ATA (1967), *India & Pakistan*, Methuen, London.
11. Tirtha R. & Krishan, Gopal (1996), *Emerging India*, Reprinted by Rawat Publications, Jaipur.
12. Tiwari, R.C. (2010), *Geography of India*, Sixth Edition, Prayag Pustak Bhawan, Allahabad.

Paper 202C: Urban Geography

Unit –I

Urban Geography-Definition, nature and scope; different approaches and recent trends in urban geography; Origin, evolution and attributes of urban places in Ancient, Medieval, Modern and Post-Modern periods; classification of urban settlements on the basis of size and function.

Unit-II

Aspects of urban places: Location, site and situation - definition, nature and significance; Urban ecological processes; Urban economic base: Basic and non-basic functions, Functional Classifications of Terms.

Theories of city structure-concentric zone theory, sector theory, multiple nuclei theory and social area analysis; input-output models.

Unit-III

Urban Systems: Urban growth and theories-Central Place Theory of Christaller and Losch; the rank-size distribution of cities; Primate city distribution.

Organization of urban space: urban morphology and land use structure: city core, commercial, industrial and residential areas; cores-country variations; city-region relations, urban sprawl, umland and periphery; rural-urban fringe-definition, delimitation and structure.

Unit-IV

Urbanization: definition and measures of urbanization, factors affecting urbanization, cycle of urbanization; Historical development of urbanization in the world: Primordial and definitive urbanization; Regional aspects of world urbanization; Patterns and trends of urbanisation in India. Contemporary urban issues: urban poverty, urban renewal, slums; transportation, housing, urban infrastructure; urban finance; environmental pollution: air, water, noise, solid waste, urban crime, issues of environmental health.

Urban policy and planning: development of small and medium sized towns globalization and urban planning in the Third World, urban land use planning, SEZ-Concept and Impact.

Recommended Readings:

1. Alam, S.M. (1964), *Hyderabad - Secunderabad Twin Cities*, Asia Publishing House, Bombay.
2. Bala, Raj (1986), *Urbanisation in India*, Rawat Publishers, Jaipur.
3. Bansal, S.C. (2008), *Urban Geography* (Hindi Edition), Meenakshi Prakashan, Meerut.
4. Bansal, S.C. (2010), *Urban Geography*, Meenakshi Prakashan, Meerut.
5. Berry, B.J.L. and Horton F.F. (1970), *Geographic Perspectives on Urban Systems*, Prentice Hall, Englewood Cliffs, New Jersey.
6. Cadwallader, Martin (1986), *Urban Geography*, Prentice Hall, New Jersey.
7. Carter, Harold (1995), *The Study of Urban Geography* (4th Edition), Arnold, London.
8. Chorley, R.J. and Haggett, P. (1966), *Models in Geography*, Methuen, London,
9. Dickinson, R.E. (1964), *City and Region*, Routledge, London.

10. Dwyer, D.J. (1971), *The City as a Centre of Change in Asia*, University of Hong Kong Press, Hongkong.
11. Hall P. (1992), *Urban and Regional Planning*, Routledge, London.
12. Hauser, Philip M. and Schnore Leo F. (eds.)(1965), *The Study of Urbanisation*, Wiley, New York.
13. James, P.E. and Jones C.F. (eds.) (1954), *American Geography, Inventory and Prospect*, Syracuse University Press, Syracuse.
14. Kundu, A. (1992), *Urban Development and Urban Research in India*, Khanna Publication, New Delhi.
15. Mayer, H.M. and Kohn, C.F. (eds.) (1958), *Readings in Urban Geography*, University of Chicago Press, Chicago.
16. Mumford, L. (1958), *Culture of Cities*, McMillan & Co., London.
17. Nangia, Sudesh (1976), *Delhi Metropolitan Region: A Study in Settlement Geography*, Rajesh Publication, New Delhi.
18. Pacione, Michael (2001), *Urban Geography-A Global Perspective*, Routledge, London,
19. Prakasa Rao, V.L.S.: *Urbanisation in India: Spatial Dimensions*, Concept Publishing Co., New Delhi.
20. Prakasa Rao, V.L.S. (1979), *The Structure of an Indian Metropolis: A Study of Bangalore*, Allied Publishers Bangalore.
21. Ramachandran, R. (1989), *Urbanisation and Urban Systems in India*, Oxford, New Delhi.
22. Rao, B.P. and Sharma, N. (2000-01), *Urban Geography* (Hindi Edition), Vasundhra Prakashan, Gorkhpur.
23. Sangwan, R.S. (2000), *Dynamics of Urban Land Use: Ecology of Residential Mobility*, Commonwealth, New Delhi.
24. Singh, K. and Steinberg, F. (eds.) (1998), *Urban India in Crisis*, New Age International, New Delhi.
25. Smailes, A.E. (1953), *The Geography of Towns*. Hutchinson, London.
26. Tewari, Vinod K.; Weinstein, Jay A.; Prakasa Rao, V.L.S. (eds.) (1986). *Indian Cities: Ecological Perspectives*, Concept Publishing Co. Pvt. Ltd., New Delhi.

Paper- 203C: QUANTITATIVE TECHNIQUES IN GEOGRAPHY

Unit - I

Statistics, Geography and Statistics; Significance of Statistics in geographical studies; Primary and Secondary Data; levels of data measurement: nominal, ordinal, interval, and ratio.

Sampling: basic concepts, sample units and design, sampling frame and procedures, standard error and sample size, testing the adequacy of samples.

Unit - II

Measures of Central Tendency: Arithmetic Mean, Median, Mode and their geographical significance; Centographic techniques: mean centre, median centre and standard distance.

Measures of dispersion and concentration: Range, quartile deviation, mean deviation, standard deviation; coefficient of variation, Lorenz Curve and Gini's Coefficient; location Quotient.

Unit - III

Bivariate Analysis: Forms of relation and measuring the strength of association and relation-construction and meanings of scatter diagram; Spearman's Rank Difference and Karl Pearson's Product Moment Correlation Coefficients;

Regression analysis- regression equations, construction of regression line-interpolation, prediction, explanation; residual-statistical tests of significance of the estimates; computation of residuals and mapping.

Unit - IV

Hypothesis Testing: Needs and types of hypotheses-goodness of fit and significance and confidence levels-parametric and non-parametric procedures: contingency tables, Chi-square test, t-test, Mann-Whitney U test, Analysis of Variance (ANOVA)

Recommended Readings:

1. David M. Smith (1975), *Patterns in Human Geography*, Penguin, Harmondsworth.
2. David Unwin (1981), *Introductory Spatial Analysis*, Methuen, London.
3. Ebdon, D. (1983), *Statistics in Geography : A Practical Approach*, Blackwell, London.
4. Gregory, S. (1978), *Statistical Methods and the Geographer*(4th Edition), Longman, London.
5. Gregory, S. (1978), *Statistical Methods and the Geographer*, Longman, London.
6. Gupta, S.P. (2010), *Statistical Methods*, Sultan Chand and Sons, Latest Edition.
7. Hammond, R. and McCullagh, P.S. (1974), *Quantitative Techniques in Geography: An Introduction*, Clarendon Press, Oxford.
8. John P. Cole and Cuchlaine, A. M. King (1968), *Quantitative Geography*, John Wiley, London.
9. Johnston R. J. (1973), *Multivariate Statistical Analysis in Geography*, Longman, London.
10. Mathews, J.A. (1987), *Quantitative and Statistical Approaches to Geography*, Practical Manual, Pergamon, Oxford.

11. Maurice Yeats (1974), *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, New York.
12. Pal, S.K. (1998), *Statistics for Geoscientists; Techniques and Applications*, Concept Publishing Company Pvt. Ltd., New Delhi.
13. Peter Haggett, Andrew D. Cliff, & Allan Frey (1977), *Location Methods*, Vols. I and II, Edward Arnold, London.
14. Peter J. Taylor (1977), *Quantitative Methods in Geography*, Houghton Mifflin Company, Boston.
15. Yeates, Mauris (1974), *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill , New York.

PAPER-204C: PRACTICAL GEOGRAPHY FIELD WORK AND REPORT WRITING

UNIT-I

Sources of data – primary and secondary; Collection of primary data: methods of primary data collection – observation method, interview method, through questionnaire, thorough schedule and other methods; questionnaire and schedule; processing and analysis of data.

UNIT - II

Field work and report writing: Identification of research problem; preparing research design; data collection through field visit; Report writing.

Recommended Readings:

1. Dey, Ian (1993), *Quantitative Data Analysis*, Routledge, London.
2. Eyles, John and David M. Smith (1988), *Qualitative Methods in Human Geography*, Polity Press, Oxford.
3. Gupta, S.P. (2010), *Statistical Methods, Twenty Fifth Edition*, Sultan Chand & Sons, New Delhi.
4. Kidder, Louise H. (1981), *Research Methods in the Social Relations*, Fourth Editions, Hault-Saunders International Editions.
5. Kitchin, Rob and Nicholas J. Tate (2002), *Conducting Research in Human Geography*, Prentice Hall, London.
6. Krishnaswamy, and Ranganatham, (2005), *Methodology of Research in Social Sciences*, Himalayan Publishing House, New Delhi.
7. Limb, Melanie and Claire Dwyer (2001), *Qualitative Methodologies for Geographers*, Arnold, London.
8. Robinson, Guy M. (1998), *Methods and Techniques in Human Geography*, John Wiley, New York.
9. Sadhu, A. N. and Singh, Amarjit (1983), *Research Methodology in Social Sciences*, Second Edition, Himalayan Publishing House, New Delhi.
10. Scale, Clive (ed.) (2008), *Social Research Methods*, (India Edition), Routledge, London.
11. Somekh, Bridget and Cathy Lewin (eds.) (2005), *Research Methods in the Social Sciences*, Vistaar Publications, New Delhi.
12. Tondon, B.C. (1979), *Research Methodology in the Social Sciences*, Chaitanya Publishing House, Allahabad.

Paper 205E : AGRICULTURAL GEOGRAPHY

Unit-I

Nature, scope, significance and development of agricultural geography. Approaches to the study of agricultural geography: Commodity, systematic and regional and systems. Origin and dispersal of agriculture. Sources of agricultural data.

Unit -II

Determinants of agricultural land use - Physical, economic, social, and technological; Land holding and land tenure systems, Land reforms, land use policy and planning.

Selected agricultural concepts and their measurements; cropping pattern, crop concentration, intensity of cropping, degree of commercialization, diversification and specialization, efficiency and productivity, crop combination regions and agricultural development.

Unit -III

Agricultural system of the world: Whittlessey's classification- shifting cultivation, plantation farming, Meditterrean agriculture, commercial grain farming;

Agricultural region: concept and techniques-Normative technique, empirical technique, single element technique and statistical technique.

Theories of agricultural location-Von Thunen's theory of agricultural location and its recent modifications.

Unit -IV

Agriculture in India- Land use and shifting cropping pattern.Regional pattern of productivity in India. Green Revolution, White Revolution, Food deficit and food surplus regions; nutritional index.

Specific problems in Indian agriculture and their management and planning. Agricultural Policy in India.

Contemporary Issues: Food, nutrition and hunger, food security, drought and foodsecurity, food aid programmes; environmental degradation, role of irrigation, fertilizers, insecticides and pesticides, technological know-how.

Recommended Readings

1. Andreae, B. (1981), *Farming Development and Scope: A World Agricultural Geography*, Water de Grytar, New York.
2. Bayliss Smith, T.P. (1987), *The Ecology of Agricultural Systems*. Cambridge University Press, London.
3. Berry, B.J.L. *et al.* (1976), *The Geography of Economic Systems*. Prentice Hall, New York.
4. Brown, L.R. (1990), *The Changing World Food Prospects - The Nineties and Beyond*, World Watch Institute, Washington D.C.

5. Dyson, T. (1996), *Population and Food - Global Trends and Future Prospects*, Routledge, London.
6. Gregor, H.P. (1970), *Geography of Agriculture*. Prentice Hall, New York.
7. Grigg, D. (), *Agricultural Geography*, Longman Ontario.
8. Grigg, D.B. (1974), *The Agricultural Systems of the World*, Cambridge University Press, New York.
9. Hartshorn, T.N. and Alexander, J.W. (1988), *Economic Geography*. Prentice Hall, New Delhi.
10. Hussain, M. (1997), *Systematic Agricultural Geography*, Rawat Publications, Jaipur.
11. Mannion, A.M. (1995), *Agriculture and Environment Change*. John Wiley, London.
12. Mohammad, Ali and Hanafi, Y.S. (2013), *Agricultural Geography*, Vasundhara Prakashan, Gorakhpur.
13. Morgan W.B. and Norton, R.J.C. (1971), *Agricultural Geography*, Mathuen, London.
14. Morgan, W.B. (1978), *Agriculture in the Third World - A Spatial Analysis*. Westview Press, Boulder.
15. Sauer, C.O. (1969), *Agricultural Origins and Dispersals*. M.I.T. Press, Mass, U.S.A.
16. Singh, J. and Dhillon, S.S. (1988), *Agricultural Geography*, Tata McGraw Hill Pub., New Delhi.
17. Tarrant, J.R. (1974), *Agricultural Geography*. Wiley, New York.

Paper- 206E: Social Geography

Unit - I

Social Geography: Nature, meaning and Development; Philosophical bases of Social Geography: Positivism, Radicalism, Humanism, Empiricism, post-modernism and post-structuralism; Social Geography in the realm of social sciences.

Unit - II

Space and society: Understanding society and its structure and process; geographical bases of social formations; contribution of social geography to social theory; power relations and space. Social well-being: Concepts of social well-being, physical quality of life, Human development; measurement of human development with social, economic and environmental indicators;

Unit - III

Towards a social geography of India; Social differentiation and region formation; evolution of socio-cultural regions of India; bases of social region formation; role of race, caste, ethnicity; religion and languages; Indian unity and diversity; social transformation and change in India.

Unit - IV

Rural urban deprivation in India with respect to healthcare; education and shelter; deprivation and discrimination issues relating to women and under privileged groups; Patterns and bases of rural and urban society.

Public policy and social planning in India: review of Five year Plans and area plans towards social policy in India; Strategies to improve social well-being in tribal, hill, drought and flood prone areas; Social and environmental impact assessment of development projects.

Recommended Readings:

1. Ahmad, Aijazuddin (1999), *Social Geography*, Rawat Publications, Jaipur and New Delhi.
2. Dreze Jean, Amartya Sen (1966), *Economic Development and Social Opportunity*, Oxford University Press, New Delhi.
3. Dubey, S.C. (1991), *Indian Society*, National Book Trust, New Delhi.
4. Gregory, D. and Larry, J. (eds.) (1985), *Social Relations and Spatial Structures*, McMillan, New York.
5. Haq. Mahbul: *Reflections on Human Development*, Oxford University Press, New Delhi.
6. Planning Commission, Government of India (1981), *Report on Development of Tribal Areas*.
7. Rao, M.S.A. (1970), *Urban Sociology in India*, Orient Longman.
8. Schwartzberg Joseph (1978), *An Historical Atlas of South Asia*, University of Chicago Press, Chicago.
9. Sen, Amartya and Dreze Jean (1966), *Indian Development: Selected Regional Perspectives*, Oxford University Press, New Delhi.
10. Smith, David (1977), *Geography: A Welfare Approach*, Edward Arnold, London.

11. Sopher, David (1980), *An Exploration of India*, Cornell University Press.
12. Subba Rao(1958), *Personality of India: Pre and Proto Historic Foundation of India and Pakistan*, M.S. University of Baroda, Vadodara.

PAPER-207E : REGIONAL PLANNING AND DEVELOPMENT

Unit I

Regional concept in geography, conceptual and theoretical framework, merits and limitations for application to regional planning and development; changing concept of the region from an inter-disciplinary view-point, concept of space, area and locational attributes. Types of regions: Formal and functional; uniform and nodal, single purpose and composite region, in the context of planning; regional hierarchy; special purpose regions.

Unit II

Physical regions, resource regions, regional divisions according to variations in levels of socio-economic development; special purpose regions-river valley regions, metropolitan regions, problem regions - hilly regions, tribal regions, regions of drought and floods.

Unit III

Approaches to delineation of different types of regions and their utility in planning.

Planning process-sectoral, temporal and spatial dimensions; short-term and long term perspectives of planning. Planning for a region's development and multi-regional planning in a national context. Indicators of development and their data sources, measuring levels of regional development and disparities - case study of India

Unit IV

Regional development strategies-concentration vs. dispersal, case studies for plans of developed and developing countries, Regional plans of India.

Concept of Multi-level planning; decentralised planning; peoples participation in the planning process; Panchayati Raj system; role and relationship of Panchayati Raj Institutions (Village Panchayat, Panchayat Samiti and Zila Parishad) and administrative structure (Village, Block and District). Regional development in India-problems and prospects.

Recommended Readings:

1. Bhatt, L.S. (1972), *Regional Planning in India*, Statistical Publishing Society, Calcutta.
2. Bhatt, L.S. *et al.* (eds.) (1982), *Regional Inequalities in India*, Society for the study of Regional Disparities, New Delhi.
3. Blunder. J. *et al.* (1973), *Regional Analysis and Development*, Harper & Row, London.
4. Chand, M and Puri, V.K. (1985), *Regional Planning in India*, Allied Pub. Pvt. Ltd. New Delhi.
5. Coates, B.R. and R.J. Johnston (1977), *Geography and Inequality*, Oxford University Press, Oxford.
6. Friedmann, J. and William Alonso (1967), *Regional Development and Planning: A Reader*, MIT Press, Cambridge Massachusetts.
7. Kuklinski, A.R. (ed.) (1972), *Growth Poles and Growth Centres in Regional Planning*, Monton, The Hague.

8. Misra R.P. *et al.* (eds.) (1974), ***Regional Development Planning in India***, Vikas, New Delhi.
 9. Raza, Moonis (1988), ***Regional Development***, Heritage, New Delhi.
- Sundram, K. V. (1977), ***Urban and Regional Planning in India***, Vikas Publishig House Pvt. Ltd., New Delhi.

**M.Sc. (Geography)
SEMESTER-III**

Paper-301C : Geography of Natural Hazards and Disaster Management

Unit I

Concept of Hazards, Risk, Vulnerability and Disaster.

Types of Hazards: Natural (Tectonic Hazards – Earthquakes and Volcanoes; Hydrological Hazards – Floods and Droughts).

Unit II

Regional Dimension of Natural Hazards: Occurrence and Trends. (Tectonic Hazards – Earthquakes and Volcanoes; Hydrological Hazards – Floods and Droughts).

Unit III

Disaster Losses and Impact – Displacements, Livelihood.
Economy and Infrastructure, and Health.

Unit IV

Mitigation and Management: Plans and Policies. Role of Remote Sensing, GIS and GPS in Disaster Management.

Recommended Readings:

1. Allan, S., Adam, B. and Carter, C. (eds.), (2000): *Environmental Risks and the Media*, Routledge, London.
2. Ambala-Bertrand, J.M. (1993), *Political Economy of Large Natural Disasters: With Special Reference to Developing Countries*, Claredon Press, Oxford.
3. Blaikie, P., Cannon, T., Davis, I.(1994), *At Risk: Natural Hazards, People's Vulnerability, and Disasters*, Routledge, London.
4. Burton, I., Kates, R.W. and White, G.F., (1993), *Environment as Hazards*, 2nd edition, Guilford Press, New York.
5. Hewitt, K., (1997), *Regions of Risk: A Geographical Introduction to Disasters*, Longman, London.
6. Hood, C. and Jones, D.K.C. (eds.), (1996), *Accident and Design: Contemporary Debates in Risk Management*, UCL Press, London.
7. Kasperson, J.X., Kasperson, R.E. and Turner, B.L. (1995), *Regions at Risk: Comparisons of Threatened Environments*, United Nation University Press, Tokyo.
8. Mitchell, J.K.(ed.) (1999), *Crucibles of Hazard: Mega-Cities and Disasters in Transition*, United Nations University Press, New York.
9. Schneider, S.K. (1995), *Flirting with Disaster: Public Management in Crisis Situations*, M.E. Sharpe, New York.
10. Quarantelli, E.L. (ed.) (1998), *What is a Disaster? Perspective on the Question*, Routledge, London.
11. Schneid, T. and Collins, L. (1998), *Disaster Management and Preparedness*, Lewis Publishers, Washington, D.C.

12. Godschalk, D.R. *et al.* (1999), *Natural Hazard Mitigation Recasting Disaster Policy and Planning*, Island Press, Washington, D.C.
13. Smith, Keith (1996), *Environmental Hazards; Assessing Risk and Reducing Disaster*, Routledge, London and New York.
14. Paraswamam, S. and Unikrishnan, P.V. (2000), *India Disaster Report*, Oxford University Press, New Delhi

PAPER-302C: OCEANOGRAPHY

Unit -I

Definition, nature and scope of oceanography, oceanography and other sciences; distribution pattern of land and water, origin of ocean basins :Wegner's drift hypothesis and sea floor spreading and Plate Tectonics.

Unit-II

Major features of ocean basins; continental margin and deep-ocean basins; ocean floor profile-continental shelf, slope, ridge and deeps, abyssal plains; submarine canyons; coral reefs-origin and distribution; ocean deposits; configuration of ocean floors of Indian Ocean and Atlantic Ocean.

Unit-III

Physical and chemical properties of sea water; Interlink between atmospheric circulation and circulation patterns in the oceans; Surface currents; thermohaline, waves and tides. Temperature of oceans; salinity in oceans; density of oceans; dynamics of ocean currents; Currents of Atlantic, Pacific and Indian Ocean; Ocean currents and their impact on climate and economy; Tides and Tsunami.

Unit-IV

Marine biological environment: bio-geochemical cycles in the ocean, biozones, types of Organisms: Palankton, Nekton and Benthos; Oceans as source of food, mineral and energy resources; sea-level changes; evidences, mechanism and impact. Major Marine Environments: Coastal,; estuaries, deltas, barrier Island; Impact of Humans on the Marine Environment. Law of the Sea; exclusive economic zone;Coral reefs-formation and types.

Recommended Readings:

1. Davis, Richard J.A. (1986), *Oceanography - An Introduction to the Marine Environment*, Wm. C. Brown, Iowa.
2. Denny, M. (2008), *How the Ocean Works : An introduction to Oceanography*, Princeton University Press, New Jersey.
3. Duxbury, C.A and Duxbury, B. (1996), *An Introduction to the world's Oceans*, 2nd Edition, C. Brown, Iowa.
4. Garrison, T. (1995), *Essentials of Oceanography*, Wards worth Pub. Co., London.
5. Garrison, T. (2001), *Oceanography - An Introduction to Marine Science*, Books/Cole, Pacific Grove, USA.
6. Gross, M. Grant (1987), *Oceanography: A View of the Earth*, Prantice - Hall Inc. New Jersey.
7. Kennel, J.P. (1982), *Marine Geology*, Prentice Hall, Englewood Cliff, New Jersey.
8. Kerhsaw, S. (2004), *Oceanography : An Earth Science Perspective*, Routledge, UK.
9. King, C.A.M. (1962), *Oceanography for Geographers*.
10. Sharma, R.C. (1985), *The Oceans*, Rajesh Publications, New Delhi.

11. Sharma, R.C. and Vatal, V. (1986), *Oceanography for Geographers*, Chatanaya Publishing, Allahabad.
12. Shepart, F. (1969), *The Earth Beneath the Sea*, Rev. ed., Athneum, New York.
13. Sieboldt, E. and W.H. Berger (1994), *The Sea Floor*, 2nd ed., Freeman, New York.
14. Stopmmel, H. (1987), *A View of the Sea*, Princeton University Press, New Jersey.
15. Ummerkutty, A.N.P. (1985), *Science of the Oceans and Human Life*, NBT, New Delhi.
16. Von Arx, W.S. (1962), *An Introduction to Physical Oceanography*, Addison, Wesley, New York.

PAPER-303C: ENVIRONMENTAL GEOGRAPHY

Unit -I

Environmental Geography: Nature and scope of environmental geography, fundamental concepts of environmental geography; Approaches and methods in Environmental Geography; Relationship with other branches of knowledge, Environment and Ecology: Meaning, structure and type of Environment, Ecology - meaning, scope and concepts. Sub-vision of ecology.

Unit-II

Ecosystem: Meaning and concepts of ecosystem, Classification and components of eco-system, trophic structure, ecological pyramid, energy flow and biogeochemical cycle; Ecological regions of India.

Unit-III

Environmental Degradation – Nature, process, types and causes of environmental degradation, Types of environmental pollution, Sources and effects of environmental pollution: air, water and land, Green house effect, Global warming.

Unit-IV

Environmental Management and Conservation and in India: Environmental management-concept, methods and approaches; .Emerging environmental issues in India, Environmental conservation and management in India; Environmental awareness and movements in India.

Recommended Readings:

1. Anderson J.M. (1981), *Ecology for Environmental Science : Biosphere, Ecosystems and Man*, Arnold, London.
2. Awasthi, N.M. and Tiwari, R.P.L. (1995), *Paryavaran Bhugool (Environmental Geography)*, Madhya Pradesh Hindi Granth Academy, Bhopal.
3. Goudie, Andrew (1984), *The Nature of the Environment*, Oxford Katerpring Co. Ltd.
4. Nobel and Wright (1996), *Environmental Science*, Prentice Hall, New York.
5. Odum, E.P. (1971), *Fundamentals of Ecology*, W.B. Sanders, Philadelphia.
6. Saxena, H.M. (1994), *Prayavaranevn Paristhitiki Bhugool (Geography of Environment and Ecology)*, Rajasthan Hindi Granth Academy, Jaipur.
7. Singh, Savinder (1991), *Environmental Geography*, Prayag Pustak Bhawan, Allahabad.
8. Singh, R.B. (ed.) (1989), *Environmental Geography*, Heritage, New Delhi.
9. Strahler, A.N. and Strahler, A.H. (1973), *Environmental Geosciences: Interaction between natural systems and Man*, John Wiley and Sons, New York.
10. Strahler, A.H. and Strahler A.N. (1977), *Geography and Mans' Environment*, John Wiley, New York.
11. William, M.M. and John, G. (1996), *Environmental Geography - Science, Landuse and Earth System*, John Wiley and Sons, New York.

Paper- 304C: Practical Geography

Morphometric Analysis

Unit - I

Morphometric Analysis of Drainage basin- its geographical significance; Basin morphometry of fluvially originated drainage basin;

Linear Aspects: Stream ordering based on Horton and Strahler, Bifurcation ratio;

Areal Aspects: Geometry of basin shape, Basin Perimeter, Length and Area, Stream frequency and Drainage density.

Unit - II

Relief Aspects: Hypsometric analysis- Hypsometric curve and Integral Hypsometric curve, Clinographic analysis, Altimetric analysis,

Slope Analysis- Average Slope (Wentworth's method), Relative Relief (Smith's method), Dissection Index, **Profile Analysis** -Longitudinal profile.

Recommended Readings:

1. Monkhouse, F.J. and H.R. Wilkinson (1980), *Maps and Diagrams*, B. I. Publications, Bombay.
2. Singh, R.L. (1979), *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
3. Singh, Savindra (1997), *Geomorphology*, Prayag Pustak Bhawan, Allahabad.
4. Sparks, B.W. (1982), *Geomorphology*, Second Edition, Longman.
5. Yadav, H.L. (2002), *Fundamentals of Practical Geography*, Radha publications, New Delhi.

Paper-305E: Geography of Tourism

Unit-I

Basics of tourism:, Definition of tourism; Factors influencing tourism: historical, natural, socio-cultural and economic; motivating factors for pilgrimages: leisure, recreation; elements of tourism, tourism as an industry.

Unit- II

Geography of tourism: - its spatial affinity; areal and locational dimensions comprising physical, cultural, historical and economic; Tourism types: cultural, eco –ethno-coastal and adventure tourism, national and international tourism; globalization and tourism.

Unit- III

Indian Tourism: regional dimensions of tourist attraction; evolution of tourism, promotion of tourism.

Impact of Tourism: Physical, economic and social, perceptual, positive and negative impacts. Tourism Paradigms: Ethnic Tourism, Sustainable Tourism and Ecotourism.

Unit- IV

Infrastructure and support system - accommodation and supplementary accommodation; other facilities and amenities; Tourism circuits-short and longer detraction - Agencies and intermediacies - Indian hotel industry.

Impacts of tourism: physical, economic and social and perceptual positive and negative impacts; Environmental laws and tourism - Current trends, spatial patterns and recent changes; Role of foreign capital & impact of globalization on tourism. Project report on relevant topics such as impact of tourism on Garhwal Himalaya, Dal Lake, Goa and North East India, impact on a historic city.

Recommended Readings:

1. Bhatia, A.K. (1996), *Tourism Development: Principles and Practices*, Setrling Publishers, New Delhi, 1996.
2. Bhatiya, A.K. (1991), *International Tourism - Fundamentals and Practices*, Sterling, New Delhi.
3. Carter, E. and Lowman, G. (1994), *Ecotoursim*, John Wiley and Sons, New York.
4. Chandra, R.H. (1998), *Hill Tourism: Planning and Development*, Kanishka Publishers, New Delhi, 1998.
5. Hunter, C. and Green, H. (1995), *Tourism and the Environment: A Sustainable Relationship*, Routledge, London.
6. Inskeep, E. (1991), *Tourism Planning: An Integrated and Sustainable Development Approach*, Van Nostrand and Reinhold, New York.

7. Kamra, K.K. and Mohinder Chand (2007), *Basics of Tourism: Theory, Operation and Practice*, Kanishka Publishers, New Delhi.
8. Kaul, R.K. (1985), *Dynamics of Tourism & Recreation*, Inter-India, New Delhi.
9. Kaur, J. (1985), *Himalayan Pilgrimages & New Tourism*, Himalayan Books, New Delhi.
10. Lea, J. (1988), *Tourism and Development in the Third World*, Routledge, London.
11. Milton, D. (1993), *Geography of World Tourism*, Prentice. Hall, New York.
12. Pearce, D.G. (1987), *Tourism To-day: A Geographical Analysis*, Harlow, Longman.
13. Robinson, H. (1996), *A Geography of Tourism*, Macdonald and Evans, London.
14. Sharma, J.K. (ed.) (2000), *Tourism Planning and Development - A New Perspective*, Kanishka Publishers, New Delhi.
15. Shaw, G. and Williams, A.M.(1994), *Critical Issues in Tourism-A Geographical Perspective*, Blackwell, Oxford.
16. Sinha, P. C. (ed.) (1998), *Tourism Impact Assessment*, Anmol Publishers, New Delhi.
17. Theobald, W. (ed.) (1994), *Global Tourism: The Next Decade*, Oxford, Butterworth, Heinemann,Oxford.
18. Voase, R. (1995), *Tourism: The Human Perspective*, Hodder & Stoughton, London.
19. Williams, A.M. and Shaw, G. (eds.), *Tourism and Economic Development – Western European Experiences*, Belhaven, London.
20. Williams, Stephen (1998), *Tourism Geography*, Routledge, London.

Paper –306E : SOIL GEOGRAPHY

Unit - I

Nature, scope and significance of Soil Geography; its relationship with Pedology; Soil forming factors: parent material, organic, climatic, topographic; Spatio-temporal dimensions.

Processes of soil formation and soil development: physical, biotic and chemical; Soil Profile and its development; Soil catena, pedogenic regimes; podzolization, laterisation, calcification and gleezation and salinization..

Unit - II

Soil organisms, macro—animals (earthworms, sowbugs, mites, centipedes, rodents and insects), Micro animals and plants - Nematodes, Protozoa rotifers; fungi, bacteria, algae and actinomyces.

Unit - III

Physical properties of soils: morphology, texture, structure, water, air, temperature and other properties of soil; Chemical properties of soil and soil reaction; methods to improve the physical qualities of soils.

Genetic classification of soils; Taxonomic classification of soils: zonal, azonal and intra-zonal soils, their characteristics and world patterns; classification and spatial distribution of Indian soils.

Unit - IV

Evaluation of land and soil: Parametric and non-parametric systems, Land capability classification, Soil survey, modern techniques, field study of soil profile and their characteristics; Soil erosion, degradation, and conservation.

Soil reclamation and management: soil survey and landforms in environmental management; Integrated soil and water management; Soil conservation in India Sustainable development of soil resources with reference to India.

Recommended Readings

1. Backman, H.O and Brady, N.C. (1960), *The Nature and Properties of Soils*, McMillan, New York.
2. Basile, R.M. (1971), *A Geography of Soils*, William C. Brown, Dubuque, Ia.
3. Bennet, Hugh H. (), *Soil Conservation*, McGraw Hill, New York.
4. Bunting, B.T. (1973), *The Geography of Soils*, Hutchinson, London.
5. Clarke, G.R. (1957), *Study of the Soil in the Field*, Oxford University Press, Oxford.
6. De, N.K. and Ghos, P. (1993): *India: A Study in Soil Geography*, Sribhumi Publishing Co., Calcutta.
7. Foth, H.D. and Turk, L.M. (1972): *Fundamentals of Soil Science*, John Wiley, New York.
8. Gardiner, James S. (1977), *Physical Geography*, Harper's College Press, New York.
9. Govinda Rajan, S.V. and Gopala Rao, H.G. (1978), *Studies on Soils of India*, Vikas, New Delhi.

10. McBride, M.B. (1999), *Environmental Chemistry of Soils*, Oxford University Press, New York.
11. Mcknight, Tom L. (1987), *Physical Geography: A Landscape Appreciation (2nd Ed.)*, Prentice Hall, inc., Englewood Cliffs, N.J.
12. Nye, P.H. and Greene, D.J. (1960), *The Soil under Shifting Cultivation* Commonwealth Bureau of Soil Science, Technical Communication, No. 51; Harpenden, England.
13. Raychoudhuri, S.P. (1958), *Soils of India*, ICAR, New Delhi.
14. Russell, Sir Edward J. (1961), *Soil Conditions and Plant Growth*, Wiley, New York.
15. Steila, D. (1976), *The Geography of Soils*, Prentice Hall, Inc., Englewood Cliffs, N.J.

Paper 307E: Remote Sensing Techniques and GIS

Unit-I

Historical development of remote sensing as a technology-Relevance of remote sensing in Geography-Concepts and basics: Energy source, energy and radiation principles, energy interactions in the atmosphere and earth surface features, remote sensing systems: platforms, sensors and radiation records.

Unit-II

Remote Sensing: Definition and Applications; Radiation principles and EMR (Electromagnetic Radiation);Energy interactions in atmosphere and Atmospheric Window; Energy interactions on earth surface and Spectral Signature; Spectral reflectance curves of earth surface features and their comparative analysis.

Unit-III

Remote Sensing Platforms: Airborne and Spaceborne; Satellite orbits: Near polar orbits and Geostationary orbits;Basic concepts of Optical, Thermal, Microwave and Hyperspectral Remote Sensing; Remote Sensing set up in India.

Unit -IV

Definition and development of GIS; Components of GIS; Functions in GIS; Data input, storage and maintenance; manipulation and analysis, output; Spatial and non spatial data in GIS and their representation; Raster and vector format of data; Integration of remote sensing data and GIS; Applications of GIS in Geography

Recommended Readings:

1. American Society for Photogrammetry and Remote Sensing (1999), *Remote Sensing for the Earth Sciences*, Manual of Remote Sensing, 3rded.,Vol. 3, Wiley, New York.
2. Avery, T.E., and Berlin, G.L. (1992), *Fundamentals of Remote Sensing and Airphoto Interpretation*, 5th Ed., Macmillan, New York.
3. Campbell, J.B. (1996), *Introduction to Remote Sensing*, 2nd Ed., Guilford, New York.
4. Curran, Paul J., (1985); *Principles of Remote Sensing*, Longman, London & New York.
5. Drury, S.A., *Images of the Earth: A Guide to Remote Sensing*, 2nd Ed., Oxford University Press, Oxford.
6. Elachi, C. (1987), *Introduction to the Physics and Techniques of Remote Sensing*, Wiley, New York.
7. Gupta, R.P. (2003), *Remote Sensing Geology*, Springer-Verlag.

8. Jensen, J.R. (2004), *Remote Sensing of the Environment: An Earth Resource Perspective*, Pearson Education.
9. Joseph, G. (2003), *Fundamentals of Remote Sensing*, Universities Press, Hyderabad.
10. Lillesand, T.M. and Kiefer, R.W. (2002), *Remote Sensing and Image Interpretation*, John Wiley and Sons, New York.
11. Nag, P. and Kudrat, M. (1998), *Digital Remote Sensing*, Concept Publishing Co., New Delhi.
12. Rampal, K.K. (1999), *Handbook of Aerial Photography and Interpretation*, Concept Publishing Co., New Delhi.
13. Robbert, G. Reaves *et al.* (1981), *Manual of Remote Sensing* (eds.), Fourth Edition, Vol. I & II, American Society of Photogrammetry, Falls Church, U.S.A.
14. Sabins, F. F. Jr. (1997), *Remote Sensing: Principles and Interpretation*, 3rd ed., W.H. Freeman, New York.
15. Sabins, F.F. (1986), *Remote Sensing-Principles and Interpretation*, Second Edition, WH Freeman and Co., New York.
16. Star, J.L.; Estes, J.E.; and McGwire, K.C. (1997), *Integration of GIS and Remote Sensing*, Cambridge University Press.
17. Wolf, Paul R. (1983), *Elements of Photogrammetry*, 2nd Ed., McGraw-Hill, New York.

M.Sc. (Geography)
SEMESTER-IV

Paper-401C: Geographical Thought

Unit - I

Geography - its field and place in the classification of sciences; Basic concepts in the philosophy of geography - distributions, relationships, interactions, areal differentiation and spatial organization.

Unit - II

Historical Development: Contributions of Greek(Eratosthenes, Ptolemy)Roman (Strabo), Arab (Ibn Khaldun), German (Bernard Varenius, Immanuel Kant, Alexander von Humboldt and Carl Ritter) geographers during ancient, medieval and modern period. Geography in the 19th century– Contributions of Friedrich Ratzel, Ferdinand von Richthofen, Alfred Hettner, and Paul Vidal de la Blache.

Unit – III

Dualisms in Geography-Systematic & Regional Geography; Physical & Human Geography; Systematic Geography & its relation with systematic sciences and with Regional Geography; The myth and reality about dualisms. Regional Geography: Concept of region, regionalization and the regional method.

Unit-IV

Laws, theories & models; Quantitative revolution in Geography; Responses to positivism, behaviourism and humanism and postmodernism in Geography.

Geography in the 20th century; Conceptual and methodological developments and changing paradigms; Kuhn's model of 'paradigm of science'; Dominant paradigms in Geography- environmental determinism and possibilism, and spatial analysis; Scientific Explanation : inductive and deductive approaches.

Future of Geography-Task ahead relating to development of Geographic thought with special reference to changing views on man-environment relationship.

Recommended Readings:

1. Abler, Ronald; Adams, John S. Gould, Peter (1971), *Spatial Organization : The Geographer's View of the World*, Prentice Hall, N.J.
2. Agnew, John *et al.* (ed.) (1996), *Human Geography*, Blackwell Publishers London.
3. Aitken Stuart & Gill Valentine ed. (2006), *Approaches to Human Geography*, Sage, London.
4. Bonnet, Alastair (2008), *What is Geography?* Sage, New Delhi.
5. Cloke, Paul and Johnston, Ron (2005), *Spaces of Geographical Thought*, Sage, London.
6. Dickinson, R.E. (1969), *The Makers of Modern Geography*, London.
7. Dikshit, R.D. (ed.) (1994), *The Art & Science of Geography: Integrated Readings*, Prentice Hall of India, New Delhi.

8. Dikshit, R.D. (1999), *Geographical Thought - A Contextual History of Ideas*, Prentice Hall of India, New Delhi.
9. Hartshorne, R. (1959), *Perspective on Nature of Geography*, Rand McNally & Co.
10. Harvey, David (1969), *Explanation in Geography*, Edward Arnold, London.
11. Harvey, David (1990), *The Condition of Postmodernity*, Blackwell, London.
12. Harvey, Milton E and Brian P. Holly (1981), *Themes in Geographic Thought*, Croom Helm, London.
13. Hubbard, Phil, Rob Kitchin and Gill Valentine (2008), *Key Texts in Human Geography*, Sage, London.
14. Hubber, Phil et. al. (2002), *Thinking Geographically: Space Theory and Contemporary, Human Geography*, Continuum, New York.
15. Husain, M. (2001), *Evolution of Geographic Thought*(fourth edition), Rawat Publication Jaipur.
16. James P.E. and Martin J. Geoffret (1972), *All Possible Worlds*, John Wiley and Sons, New York.
17. Johnston, R.J. (1988), *The Future of Geography*, Methuen, London.
18. Johnston, R.J. (2004), *Geography and Geographers*, Arnold London.
19. Minshull, R. (1970), *The Changing Nature of Geography*, Hutchinson University Library, London,
20. Peet, Richard (1998), *Modern Geographical Thought*, Oxford Blackwell.
21. Peet, Richard (2003), *Radical Geography*, (Indian Reprint), Rawat Publication, New Delhi.
22. Soja, Edward W. (1997), *Postmodern Geographies*, Indian edn. Rawat Publications, New Delhi.
23. Unwin, Tim (1992), *The place of Geography*, Pearson Education Limited, Essex.

PAPER-402C: RESEARCH METHODOLOGY

Unit -I

Meaning and Purpose of Research, Types of Research; Social Science Research, Identification of Research Questions and Literature Surveying; Methods and Methodology in Human Geography.

Unit-II

Scientific Method in Human Geography; Analytical Steps of the Scientific Method; The Routes of Scientific Explanation: Deductive and Inductive forms of reference; Explanation in Geography: Some Problems.

Unit-III

From Quantitative to Qualitative Geography; Qualitative Data Production: Interviews (Process of Interviewing. Structure interviews and informal surveys; Depth Interviewing and Working with Groups); Observation.

Unit-IV

Field work in Geographical Studies; Data Creation: Census Method and Sampling Method (Random, Systematic, Stratified, Multi-Stage, Accidental and Purposive); Process of Research Report Writing.

Recommended Readings:

1. Dey, Ian (1993), *Quantitative Data Analysis*, Routledge, London.
2. Eyles, John and David M. Smith (1988), *Qualitative Methods in Human Geography*, Polity Press, Oxford.
3. Harvey, David (1969), *Explanation in Geography*, Edward Arnold, London.
4. Hubbard, Keith *et al.* (2002), *Thinking Geographically*, Continuum, London.
5. Hoggart, Keith *et al.* (2002), *Researching Human Geography*, Arnold, London.
6. Johnston, R.J. and J.D. Sidaway (2004), *Geography and Geographers*, Arnold, London.
7. Kidder, Louise H. (1981), *Research Methods in the Social Relations*, Fourth Editions, Hault-Saunders International Editions.
8. Kitchin, Rob and Nicholas J. Tate (2002), *Conducting Research in Human Geography*, Prentice Hall, London.
9. Krishnaswamy, and Ranganatham, (2005), *Methodology of Research in Social Sciences*, Himalayan Publishing House, New Delhi.
10. Limb, Melanie and Claire Dwyer (2001), *Qualitative Methodologies for Geographers*, Arnold, London.
11. Robinson, Guy M. (1998), *Methods and Techniques in Human Geography*, John Wiley, New York.
12. Scale, Clive (ed.) (2008), *Social Research Methods*, (Indian Edition), Routledge, London.
13. Somekh, Bridget and Cathy Lewin (eds.) (2005), *Research Methods in the Social Sciences*, Vistaar Publications, New Delhi.

14. Tondon, B.C. (1979), *Research Methodology in the Social Sciences*, Chaitanya Publishing House, Allahabad.

PAPER-403C: Practical Geography

Interpretation of Aerial Photographs & Satellite Images and Thematic Mapping

Unit I

Stereo Vision Test, Orientation of stereo model under Mirror Stereoscope;
Determination of scale on an aerial photograph ;
Measurement of height of an object on single vertical aerial photograph ;
Parallax bar measurement and height determination;
Preparation of stereogram, stereotriplet and mosaic from aerial photographs.

Unit-II

Interpretation of Aerial photographs : Identification, mapping and interpretation of Natural and Cultural features (at least Two exercises);
Interpretation of a Satellite Image (Landsat, LISS III, LISS IV, Cartosatetc) : Identification, mapping and interpretation of Natural and Cultural features (at least Two exercises);

Unit III

Comparison of features on Panchromatic, True Colour and False Colour Composite images and Preparation of interpretation keys;
Mapping Land Use/land Cover with any Software (at least one exercise each on Point, line and polygon features)

Recommended Readings:

1. Heywood, Ian *et al.* (2002), *Geographical Information Systems* (Second edition), Pearson Education, Delhi.
2. Lillesand, T.M. and Kiefer, R.W. (2002), *Remote Sensing and Image Interpretation*, John Wiley and Sons, New York.
3. Nag. P. and Kudrat M. (1998), *Digital Remote Sensing*, Concept Publishing Co., New Delhi.
4. Rampal, K.K. (1999), *Handbook of Aerial Photography and Interpretation*, Concept Publishing Co., New Delhi.
5. Robbert, G. Reaves *et.al.* (eds.) (1981), *Manual of Remote Sensing*, Fourth Edition, Vols. I & II, American Society of Photogrammetry, Falls Church, U.S.A.
6. Sabins, F.F. (1986), *Remote Sensing-Principles and Interpretation*, Second Edition, WH Freeman and Co., New York.
7. Sharma, J.P. (1996), *Prayogic Bhoogol*, Rastogi Publicatoinis, Meerut.

8. Wolf, Paul R. (1983), *Elements of Photogrammetry*, 2nd Ed., McGraw-Hill, New York.



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