THE UNIVERSITY OF BURDWAN

Syllabus for 3-Year Degree/4-Year Honours
in
Geography
Under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020
With effect from 2023-24

SEMESTER WISE AND COURSE WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP AS PER NEP, 2020

SEM	COURSE TYPE	COURSE NAME	CREDIT	MARKS				DISTRIBUTION OF CREDIT		
				IA	ESE (TH)	ESE (PR)	TOTAL	LECT	TUTO	PR
I	**MAJOR/DS COURSE CODE: GEOG 1011**	GEOTECTONICS AND GEOMORPHOLOGY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MINOR COURSE CODE:GEOG 1021	GEOTECTONICS AND GEOMORPHOLOGY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MULTIDISCIPLINARY COURSE CODE: GEOG 1031	PHYSICAL GEOGRAPHY	**3**	**10**	**40**	**0**	**50**	**2**	**1**	**0**
	ABILITY ENHANCEMENT COURSE(AEC) CODE: 1041	Arabic/ Bengali/ Hindi/ Sanskrit/ Santali/ Urdu or Equiv. Course from SWAYAM /Any other UGC recognized platform	**2**	**10**	**40**	**0**	**50**	**2**	**0**	**0**
	SKILL ENHANCEMENT COURSE (SEC) CODE: GEOG 1051	COMPUTER BASICS AND COMPUTER APPLICATIONS	**3**	**10**	**0**	**40**	**50**	**0**	**0**	**3**
	VALUE ADDED COURSE(VAC) CODE: CVA1061	ENVIRONMENTAL SCIENCE/ EDUCATION	**4**	**20**	**60**	**20**	**100**	**3**	**1**	**1**
	TOTAL		**20**				**400**			
II	**MAJOR/DS COURSE CODE: GEOG 2011**	POPULATION AND SETTLEMENT GEOGRAPHY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MINOR COURSE CODE: GEOG 2021	POPULATION AND SETTLEMENT GEOGRAPHY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MULTIDISCIPLINARY COURSE CODE: GEOG 2031	HUMAN GEOGRAPHY	**3**	**10**	**40**	**0**	**50**	**2**	**1**	**0**
	ABILITY ENHANCEMENT COURSE(AEC) CODE: ENGL 2041	Functional English or Equiv. Course from SWAYAM/ /Any other UGC-recognized platform	**2**	**10**	**40**	**0**	**50**	**2**	**0**	**0**
	SKILL ENHANCEMENT COURSE (SEC) CODE: GEOG 2051	FIELD TECHNIQUES	**3**	**10**	**40**	**0**	**50**	**2**	**1**	**0**
	VALUE ADDED COURSE(VAC) CODE: CVA 2061	Understanding India/Digital & Tech. Solutions/Health & Wellness, Yoga Edu, Sports & Fitness	**4**	**20**	**80/60**	**0/20**	**100**	**3/3**	**1/0**	**0/1**
	Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.									
	TOTAL		**20**				**400**			

GEOGRAPHY (MAJOR)
SEMESTER I
COURSE 1 (CODE: GEOG 1011)

COURSE TITLE: GEOTECTONICS AND GEOMORPHOLOGY **Credits: 4**

Lecture hours: 60

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To instil fundamental knowledge about the different aspects of Physical Geography, especially Geotectonics and Geomorphology with the objective to educate them regarding the characteristics of different Earth surface processes and landforms.

Learning Outcome: ● Students shall gather ideas about structure of the Earth and the causes for the different tectonic activities over the Earth. They also get opportunity to learn about different exogenic processes and resultant landforms.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Physical Geography or Earth Sciences.

UNIT I: Concepts in Geotectonic

Lecture hours (30 hrs)

1. Earth's crust and interior: Internal structure with seismological evidences 5
2. Theories of Isostasy: Airy & Pratt 4
3. Continental Drift: Evidences, criticism and importance 5
4. Sea floor spreading: Process, evidences (Palaeomagnetism) 5
5. Plate Tectonics: Mechanism of movements, vulcanism, genesis of earthquake and Mountain building 6
6. Folds and Faults: Origin and classification 5

UNIT II: Fundamentals of Geomorphology

Lecture hours (30Hrs)

1. Fundamental principles of Geomorphology 4
2. Denudational processes and resultant landforms: Weathering and Mass movement 5
3. Theories of landscape evolution: Davis, Penck, and Hack 6
4. Slope development: Theories of King and Wood 4
5. Processes and landforms: Fluvial and Coastal 6
6. Drainage development on Uniclinal and folded structure 5

Suggested Readings: Geotectonics and Geomorphology

1. Bloom, A. L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey

2. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey

3. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington

4. Duff, D. (1993): Holmes': *Principles of Physical Geology*, Stanley Thornes, Cheltenham

5. Erickson, J. (2001): *Plate Tectonics: Unravelling the Mysteries of the Earth*, Checkmark Books, New York

6. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London

7. Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology: A Very Short Introduction,* Oxford University Press, Oxford

8. Holmes, A. (1978): *Principles of Physical Geology*, Van Nostrand Rheinhold, New York

9. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York

10. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata

11. Keary, P. and Vine, M. (1997): *Global Tectonics*, Blackwell Scientific Publications, Oxford

12. Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London

13. Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford

14. Siddhartha, K. (2001): *The Earth's Dynamic Surface*, Kisalaya Publications, New Delhi

15. Singh, S. (2000): *Geomorphology*, Prayag Pustak Bhavan, Allahabad

16. Strahler, A.H. and Strahler A.N. (1992): *Modern Physical Geography*, John Wiley & Sons, New York

17. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London

18. Summerfield, M.A. (ed.) (2000): *Geomorphology and Global Tectonics*, Wiley, Chichester

19. Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston

20. Thornbury, W. D. (I960): *Principles of Geomorphology*, John Wiley & Sons, New York

21. Wooldridge, S.W. and Morgan, R.S. (1937): *An Outline of Geomorphology: The Physical Basis of Geography*, Longman, London

22. Young, A. (1972): *Slopes,* Oliver and Boyd, Edinburg

SEMESTER II
GEOGRAPHY (MAJOR)
COURSE II (CODE: GEOG 2011)

COURSE TITLE: POPULATION AND SETTLEMENT GEOGRAPHY **Credits: 4**
Lecture hours: 60

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To inculcate fundamental knowledge about Population Geography and basic concepts in Settlement Geography.

Learning Outcome: ● Students shall gather ideas about the dynamics of population and its different measures and also about the different types & patterns of settlement. The course will help them to gather ideas about fundamental concepts in Urban Geography.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Population studies or in Urban Geography.

UNIT I: Population Geography — Lecture hours (30Hrs)

1. Development of Population Geography; Relation between Population Geography and Demography 4
2. Determinants of Population Dynamics: Fertility, Mortality and Migration 4
3. Measures of Fertility and Mortality 5
4. Migration: Theories, Causes and Types 5
5. Theories of population growth: Malthus and Marx; Demographic Transition Theory (Thompson and Notestein) 6
6. Population Composition (Age-Sex; Occupational Structure); Population policies (India and Sweden). 6

UNIT II: Settlement Geography — Lecture hours (30Hrs)

1. Development of Settlement Geography 4
2. Characteristics of Rural Settlement: Site, Situation, types and Pattern 5
3. Morphology of rural Settlements 4
4. Urban Settlements: Census Definition, Urban Agglomeration; Urban sprawl, Rural-urban Continuum, Rurban and Periurban 5
5. Urban Morphology: Classical Models of Burgess, Hoyt, Harris and Ullman 6
6. Central place theory and Hierarchy of settlements; Urban primacy 6

Suggested Readings: Social & Cultural Geography

1. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi.
2. Beaujeu- Garnier, J. (1966) Geography of Population. London: Longman.
3. Bhende, A.S. and Kanitkar, T. (2015) Principles of Population Studies. Mumbai: Himalaya Publishing House.
4. Casino, V.J.D., Jr., (2009): *Social Geography*: A Critical Introduction, Wiley-Blackwell, Chichester.
5. Chandana, R.C. (2021) Geography of Population – Concept, Determinants and World Pattern. New Delhi: Kalyani Publishers.
6. Clarke, J.I. (1972): Population Geography, Pergamon Press, Oxford.
7. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): *Geography and Inequality*, Oxford University Press, Oxford and London.
8. Dubey. S.C. (1991): *Indian Society*, National Book Trust, New Delhi.
9. Eyles, J. (ed.) (1986): *Social Geography in International Perspective*, Rowman and Littlefield, New Jersey and Los Angeles.
10. Ghosh, S. (1998) Settlement Geography. Kolkata: Orient Longman Ltd.
11. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London.
12. Haq, M. (2000): *Reflections on Human Development*, Oxford University Press, New Delhi.
13. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London
14. Mandal, R.B. (2001) Introduction to Rural Settlements. New Delhi: Concept Publishing Company.
15. Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities,* Oxford University Press, Toronto.
16. Ramachandran, R. (2010) Urbanisation and Urban Systems of India. New Delhi: Oxford University Press.
17. Roy, D. (2015) Population Geography. Kolkata: Books & Allied (P) Ltd.
18. Rubenstein, J.M. (2002), *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs.
19. Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi.
20. Singh, R.Y. (1994) Geography of Settlement. Jaipur: Rawat Publications, Jaipur.
21. Smith, D. (1977): *Geography: A Welfare Approach*, Edward Arnold, London .
22. Tiwari, R.C. (2020) Settlement Geography – Rural and Urban Settlement. Allahabad: Pravalika Publications.
23. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, U.K.

GEOGRAPHY (MINOR)
SEMESTER- I
COURSE 1 (CODE: GEOG 1021)

COURSE TITLE: GEOTECTONICS AND GEOMORPHOLOGY **Credits: 4**

Lecture hours: 60

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To instil fundamental knowledge about the different aspects of Physical Geography, especially Geotectonics and Geomorphology with the objective to educate them regarding the characteristics of different Earth surface processes and landforms.

Learning Outcome: ● Students shall gather ideas about structure of the Earth and the causes for the different tectonic activities over the Earth. They also get opportunity to learn about different exogenic processes and resultant landforms.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Physical Geography or Earth Sciences.

UNIT I: Concepts in Geotectonic

Lecture hours (30 hrs)

1. Earth's crust and interior: Internal structure with seismological evidences	5
2. Theories of Isostasy: Airy & Pratt	4
3. Continental Drift: Evidences, criticism and importance	5
4. Sea floor spreading: Process, evidences (Palaeomagnetism)	5
5. Plate Tectonics: Mechanism of movements, vulcanism, genesis of earthquake and Mountain building	6
6. Folds and Faults: Origin and classification	5

UNIT II: Fundamentals of Geomorphology

Lecture hours (30Hrs)

1. Fundamental principles of Geomorphology	4
2. Denudational processes and resultant landforms: Weathering and Mass movement	5
3. Theories of landscape evolution: Davis, Penck, and Hack	6
4. Slope development: Theories of King and Wood	4
5. Processes and landforms: Fluvial and Coastal	6
6. Drainage development on Uniclinal and folded structure	5

Suggested Readings: Geotectonics and Geomorphology

1. Bloom, A. L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey

2. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey

3. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington

4. Duff, D. (1993): Holmes': *Principles of Physical Geology*, Stanley Thornes, Cheltenham

5. Erickson, J. (2001): *Plate Tectonics: Unravelling the Mysteries of the Earth*, Checkmark Books, New York

6. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London

7. Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology: A Very Short Introduction,* Oxford University Press, Oxford

8. Holmes, A. (1978): *Principles of Physical Geology*, Van Nostrand Rheinhold, New York

9. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York

10. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata

11. Keary, P. and Vine, M. (1997): *Global Tectonics*, Blackwell Scientific Publications, Oxford

12. Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London

13. Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford

14. Siddhartha, K. (2001): *The Earth's Dynamic Surface*, Kisalaya Publications, New Delhi

15. Singh, S. (2000): *Geomorphology*, Prayag Pustak Bhavan, Allahabad

16. Strahler, A.H. and Strahler A.N. (1992): *Modern Physical Geography*, John Wiley & Sons, New York

17. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London

18. Summerfield, M.A. (ed.) (2000): *Geomorphology and Global Tectonics*, Wiley, Chichester

19. Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston

20. Thornbury, W. D. (I960): *Principles of Geomorphology*, John Wiley & Sons, New York

21. Wooldridge, S.W. and Morgan, R.S. (1937): *An Outline of Geomorphology: The Physical Basis of Geography*, Longman, London

22. Young, A. (1972): *Slopes,* Oliver and Boyd, Edinburg

GEOGRAPHY (MINOR)
SEMESTER- II
COURSE 1I (CODE: GEOG 2021)

COURSE TITLE: POPULATION AND SETTLEMENT GEOGRAPHY **Credits: 4**
Lecture hours: 60

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To inculcate fundamental knowledge about Population Geography and basic concepts in Settlement Geography.

Learning Outcome: ● Students shall gather ideas about the dynamics of population and its different measures and also about the different types & patterns of settlement. The course will help them to gather ideas about fundamental concepts in Urban Geography.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Population studies or in Urban Geography.

UNIT I: Population Geography

Lecture hours (30Hrs)

1. Development of Population Geography; Relation between Population Geography and Demography 4
2. Determinants of Population Dynamics: Fertility, Mortality and Migration 4
3. Measures of Fertility and Mortality 5
4. Migration: Theories, Causes and Types 5
5. Theories of population growth: Malthus and Marx; Demographic Transition Theory (Thompson and Notestein) 6
6. Population Composition (Age-Sex; Occupational Structure); Population policies (India and Sweden). 6

UNIT II: Settlement Geography

Lecture hours (30Hrs)

1. Development of Settlement Geography 4
2. Characteristics of Rural Settlement: Site, Situation, types and Pattern 5
3. Morphology of rural Settlements 4
4. Urban Settlements: Census Definition, Urban Agglomeration; Urban sprawl, Rural-urban Continuum, Rurban and Periurban 5
5. Urban Morphology: Classical Models of Burgess, Hoyt, Harris and Ullman 6
6. Central place theory and Hierarchy of settlements; Urban primacy 6

Suggested Readings: Social & Cultural Geography

1. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi.
2. Beaujeu- Garnier, J. (1966) Geography of Population. London: Longman.
3. Bhende, A.S. and Kanitkar, T. (2015) Principles of Population Studies. Mumbai: Himalaya Publishing House.
4. Casino, V.J.D., Jr., (2009): *Social Geography*: A Critical Introduction, Wiley-Blackwell, Chichester.
5. Chandana, R.C. (2021) Geography of Population – Concept, Determinants and World Pattern. New Delhi: Kalyani Publishers.
6. Clarke, J.I. (1972): Population Geography, Pergamon Press, Oxford.
7. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): *Geography and Inequality*, Oxford University Press, Oxford and London.
8. Dubey. S.C. (1991): *Indian Society*, National Book Trust, New Delhi.
9. Eyles, J. (ed.) (1986): *Social Geography in International Perspective*, Rowman and Littlefield, New Jersey and Los Angeles.
10. Ghosh, S. (1998) Settlement Geography. Kolkata: Orient Longman Ltd.
11. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London.
12. Haq, M. (2000): *Reflections on Human Development*, Oxford University Press, New Delhi.
13. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London
14. Mandal, R.B. (2001) Introduction to Rural Settlements. New Delhi: Concept Publishing Company.
15. Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities,* Oxford University Press, Toronto.
16. Ramachandran, R. (2010) Urbanisation and Urban Systems of India. New Delhi: Oxford University Press.
17. Roy, D. (2015) Population Geography. Kolkata: Books & Allied (P) Ltd.
18. Rubenstein, J.M. (2002), *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs.
19. Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi.
20. Singh, R.Y. (1994) Geography of Settlement. Jaipur: Rawat Publications, Jaipur.
21. Smith, D. (1977): *Geography: A Welfare Approach*, Edward Arnold, London.
22. Tiwari, R.C. (2020) Settlement Geography – Rural and Urban Settlement. Allahabad: Pravalika Publications.
23. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, U.K.

GEOGRAPHY
MULTIDISCIPLINARY COURSES (MDC)
SEMESTER I
COURSE: 1 (CODE: GEOG 1031)

COURSE TITLE: PHYSICAL GEOGRAPHY (Theory) **Credits: 3**
Lecture hours: 45

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10Marks)

Objectives of the Course: Students can acquire knowledge and develop an understanding of concepts, processes and methods of Physical Geography. Students may develop an interest in Geography through this course. Students can familiarize themselves with key concepts, terminology and core principles of Geography.

Learning Outcomes:

Students can apply the knowledge of the principles of Physical Geography in explaining the causes and consequences of natural hazards and suggest ways of coping with them through sustainable development. They will understand and analyze physical environments and utilize such knowledge in reflecting on issues on nature.

Professional Skill Development:

The acquired knowledge is beneficial to providing for future studies in geography. This obtained knowledge will definitely providing basic inputs in skill development which will place the students in their professional life in the near future.

	Lecture hours
1. Internal Structure of Earth	5
2. Geomorphic Processes: Weathering and Erosion	6
3. Processes and Landforms: Fluvial, Glacial and Aeolian	8
4. Composition and Structure of Atmosphere	6
5. Insolation, Heat Budget, Horizontal and Vertical Distribution of Temperature	6
6. Hydrological Cycle	4
7. Soil forming factors; Types of soil: Zonal, Azonal and Intrazonal	6
8. Classification of Natural Vegetation	4

Suggested Readings :

1. Barry, R. G, Chorley R. J. 2009 Atmosphere Weather and Climate. 9th Ed, Routledge.
2. Conserva H. T., 2004: Illustrated Dictionary of Physical Geography, Author House, USA.
3. Daji, J. A., Kadam, J.R., Patil, N.D. 1996 A Textbook of Soil Science, Media Promoters and Publishers Pvt Ltd.
4. Gabler R.E., Petersen J.F. and Trapasso, L.M., 2007: Essentials of Physical Geography (8thEdition), Thompson, Brooks/Cole, USA.
5. Garrett. N., 2000: Advanced Geography, Oxford University Press.
6. Goudie, A., 1984: The Nature of the Environment: An Advanced Physical Geography, Basil Blackwell Publishers, Oxford.
7. Hamblin, W.K. 1995: Earth's Dynamic System, Prentice Hall, N.J.
8. HusainM.2002: Fundamentals of Physical Geography, Rawat Publications, and Jaipur.
9. Lal, D. S. 2012. Climatology. Sharda Pustak Bhawan.
10. Monkhouse, F.J.2009: Principles of Physical Geography, Platinum Publishers, Kolkata.
11. Strahler A.N. and Strahler A.H., 2008: Modern Physical Geography, John Wiley & Sons, New York.

GEOGRAPHY
MULTIDISCIPLINARY COURSES (MDC)
SEMESTER II
COURSE: 2 (CODE: GEOG 2031)

COURSE TITLE: HUMAN GEOGRAPHY (Theory) **Credits: 3**

Lecture hours: 45

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10 Marks)

Objectives of the Course: Students can acquire knowledge and develop an understanding of concepts, processes and methods of Human Geography. Students may develop an interest in Human Geography through this course. Students can familiarize themselves with key concepts, terminology and core principles of Human Geography. They can easily recognize and understand the processes and patterns of the spatial arrangement of the natural features as well as human aspects and phenomena on the earth's surface.

Learning Outcomes: Students achieve knowledge about major themes of human geography. They can develop an idea about space and society and build an idea about population growth and distribution of population. This module helps to recognize about population –resource relationship. They will understand and analyze the inter-relationship between physical and human environments and utilize such knowledge in reflecting on issues related to society.

Professional Skill Development: The acquired knowledge is beneficial to providing for future studies in Geography. This obtained knowledge will definitely providing basic inputs in skill development which will place the students in their professional life in the near future.

	Lecture hours
1. Population: Distribution, Density and Growth	6
2. Types of population migration	5
3. Economic Activities: Primary, Secondary and Tertiary	6
4. Types and Patterns of Rural Settlements	6
5. Definition and Types of Urban Settlements	6
6. Major Ethnic groups of the World	6
7. Cultural Diffusion	5
8. Indicators of Human Development	5

Suggested Readings:

1. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi.
2. Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
3. Clarke, J.I. (1972): Population Geography, Pergamon Press, Oxford.
4. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
5. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
6. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W.H. Freeman and Company, New York.
7. Ghosh, S. (2015) Introduction to settlement geography. Orient Black Swan Private Ltd., Kolkata.
8. Ghosh, S. (1998) Settlement Geography. Kolkata: Orient Longman Ltd.
9. Hussain, Majid (2012) Manav Bhugol. Rawat Publications, Jaipur
10. Rubenstein, J.M. (2002), *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs.

GEOGRAPHY

SKILL ENHANCEMENT COURSE (SEC)
SEMESTER I
COURSE: 1 (CODE: GEOG 1051)

COURSE TITLE: COMPUTER BASICS AND COMPUTER APPLICATIONS (Practical) **Credits: 3**

Lecture hours: 90

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10 marks)

Objectives: This is an initiative to develop the basics of computer applications to students so that they can apply it to solve the geographical problems through statistical methods. From this course students can learn the significance of computer applications in geographical studies.

Learning Outcomes: Students shall know about fundamentals of computer applications. They can develop an idea about computer basics and acquire skill to solve the statistics. They will be able to identify correlations of different variables and can establish solution of research problems through statistical procedure with the help of computer application.

Professional Skill Development: The acquired knowledge is beneficial to providing for future studies in Geography. This obtained knowledge will definitely providing basic inputs in skill development which will place the students in their professional life in the near future.

	Lecture hours
1. Numbering Systems; Binary Arithmetic	10
2. Data Computation, Storing and Formatting in Spreadsheets: Computation of Rank, Mean, Median, Mode, Standard Deviation,	25
3. Moving Averages, Derivation of Correlation, Covariance and regression; Selection of technique and interpretation.	25
4. Preparation of annoted diagrams and its interpretation: Scatter diagram and Histogram	20
5. Internet surfing: generation and extraction of information	10

(Sub unit 2, 3, 4 will be done by using MS Excel)

Suggested Readings:

1. Bartee, Thomas C. (1977): Digital Computer Fundamental; McGraw Hill.
2. Chauhan, S.; Chauhan, A. and Gupta, K. (2006): Fundamental of Computer; Firewall Media.
3. Flake, L.J.; McClintock, C.E. and Turner, S. (1989): Fundamental of Computer Education; Wordsworth Pub. Co.
4. Leon, A. and Leon, M.(1999): Introduction to Computer, USB Publishers' Distributors Ltd.
5. Malvino, A.P. and Leach, D.P. (1981): Digital Principles and Applications; Tata Mc Graw Hill.
6. Mano, Moris M. and Kime, Charles R. (2004): Logic and Computer Design Fundamental; Prentice Hall. Rajaraman, V.(2003): Fundamentals of Computer, Prentice Hall Publisher
7. Sarkar, A. and Gupta, S.K (2002): Elements of computer Science, S Chand and Company, New Delhi Blissmer (1996): Working with MSWord; Houghton Mifflin Co.
8. Johnson, Steve (2007): Microsoft PowerPoint 2007; Pearson Paravia Bruno.
9. Leon, A .and Leon, M. (1999): Introduction to Computer, USB Publishers' Distributors Ltd.
10. Leon, A. and Leon, M.(1999):A beginners Guide to Computers, Vikas

10. Rajaraman, V. (2008): Computer Primer; Prentice Hall of India Pvt. Ltd.
11. Sarkar, A. and Gupta, S .K (2002) Elements of computer Science, S Chand and Company, New Delhi
12. Shepard, Aaron (2007): Perfect Pages; Shepard Publications. Tyson,
13. Herbert L. (2007): Microsoft Word 2007 Bible; John Wiley.
14. Walkenbach, John (2007): Excel 2007 Bible; John Wiley

GEOGRAPHY

SKILL ENHANCEMENT COURSE (SEC)
SEMESTER II
COURSE: 2 (CODE: GEOG 2051)

COURSE TITLE: FIELD TECHNIQUES (Theory) **Credits: 3**

Lecture hours-45

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10marks)

Objectives: This is an initiative to develop the basic concept of field technique to students so that they can apply it to solve the geographical problems in the field. From this course students can learn the significance of field techniques in geographical studies, understand the meaning of field and identifying the case study.

Learning Outcomes: Students shall know about different types of field techniques. They can develop an idea about research problems and acquire observation power through field experience in future they will be able to identify the socio environmental problems of a locality. They will be capable to develop communication skill and interaction power.

Professional Skill Development: The acquired knowledge is beneficial to providing for future studies in geography. This obtained knowledge will definitely providing basic inputs in skill development which will place the students in their professional life in the near future.

	Lecture hours
1. Fieldwork in Geographical studies – Role and significance, Selection of study area and objectives, Pre-field preparations, Ethics of fieldwork	10
2. Preparation of Survey Schedule and Questionnaires (open, closed, structured, non-structured)	8
3. Interview with special reference to focused group discussions	7
4. Field techniques and tools: Landscape survey using transects and quadrants, constructing a sketch, photo and video recording	10
5. Collection of samples. Preparation of inventory from field data. Post-field tasks	10

Suggested Readings:

1. Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications
2. Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi
3. Evans M., 1988: “Participant Observation: The Researcher as Research Tool” in Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
4. Mukherjee, Neela 2002. Participatory Learning and Action: with 100 Field Methods. Concept Publs. Co., New Delhi
5. Robinson A., 1998: "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
6. Special Issue on “Doing Fieldwork” The Geographical Review 91:1-2 (2001).
7. Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/ Kothari, C. R. and Garg, G., 2018, Research Methodology, Methods and Techniques, New Age International Publication, New Delhi

COURSE STRUCTURE UNDER CCFUP (AS PER NEP 2020) FOR B.A/B.Sc. 3YR DEGREE/4YR HONS. IN GEOGRAPHY

Semester-wise distribution of Credits and Marks

SEMESTER	COURSE TYPE	COURSE NAME WITH CODE	CREDIT	DISTRIBUTION OF CREDIT			MARKS			
				LECT	TUTO	PR	IA	ESE (TH)	ESE (PR)	TOTAL
III	**MAJOR/DS COURSE**	GEOGRAPHY OF INDIA CODE: **GEOG 3011**	**5**	**4**	**1**	**0**	**15**	**60**	**0**	**75**
		CARTOGRAPHY AND SURVEYING (PR) CODE: **GEOG 3012**	**5**	**0**	**0**	**5**	**15**	**0**	**60**	**75**
	MINOR COURSE[#] (Vocational Education and Training) **CODE: MSR 3021** **Or** **CODE: HRM 3021** **Or** **CODE: RSA 3021**	Medical Sales Representative Or Human Resource Management Or Retail Sales Associate	**4**	**3**	**1**	**0**	**15**	**60**	**0**	**75**
	MULTIDISCIPLINARY COURSE[#]	ENVIRONMENTAL GEOGRAPHY CODE: **GEOG 3031**	**3**	**2**	**1**	**0**	**10**	**40**	**0**	**50**
	ABILITY ENHANCEMENT COURSE(AEC)	L_1-2-MIL Arabic/ Bengali/ Hindi/ Sanskrit/ Santali/ Urdu or Equvlnt. Course from SWAYAM or UGC recognized others CODE--------- **3041**	**2**	**2**	**0**	**0**	**10**	**40**	**0**	**50**

	SKILL ENHANCEMENT COURSE (SEC)	BASICS OF RS&GIS (PR) CODE: **GEOG 3051**	**3**	**0**	**0**	**3**	**10**	**0**	**40**	**50**
	TOTAL		**22**							**375**
IV	**MAJOR/DS COURSE**	CLIMATOLOGY CODE: **GEOG 4011**	**5**	**4**	**1**	**0**	**15**	**60**	**0**	**75**
		ECONOMIC GEOGRAPHY CODE: **GEOG 4012**	**5**	**4**	**1**	**0**	**15**	**60**	**0**	**75**
		MAP PROJECTION AND MAP ANALYSIS (PR) CODE: **GEOG 4013**	**5**	**0**	**0**	**5**	**15**	**0**	**60**	**75**
	MINOR COURSE#	FUNDAMENTALS OF CLIMATOLOGY AND BIOGEOGRAPHY CODE: **GEOG 4021**	**4**	**3**	**1**	**0**	**15**	**60**	**0**	**75**
	MINOR COURSE# (Vocational Education and Training) **CODE: MSR 4021** **Or** **CODE: HRM 4021** **Or** **CODE: RSA 4021**	Medical Sales Representative Or Human Resource Management Or Retail Sales Associate	**4**	**3**	**1**	**0**	**15**	**60**	**0**	**75**
	ABILITY ENHANCEMENT COURSE(AEC)	L_2-2-English: Language and Creativity CODE: **ENGL 4041** or equivalent Course from SWAYAM or UGC recognized other Platform.	**2**	**2**	**0**	**0**	**10**	**40**	**0**	**50**
	TOTAL		**25**							**425**

**** IA- INTERNAL ASSESSMENT, ESE-END SEMESTER EXAMINATION, TUTO-TUTORIAL, LECT- LECTURE, TH-THEORY, PR-PRACTICAL**

GEOGRAPHY (MAJOR) SEMESTER III

COURSE 1 (CODE: GEOG 3011)

COURSE TITLE: GEOGRAPHY OF INDIA **Credit: 5**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: • To provide knowledge about the Physiography, Economy, and Demography of India.

Learning Outcome: ● To gain enough knowledge about the Physiography, Economy and Demography of India.

Professional Skill Development: ● Several skills and knowledge will develop among the students after studying about their nation which will help them to become an expert and professional planner for the betterment of the nation. It will also help them for preparation of different competitive examinations.

UNIT I: Physical Geography

1. Geological set-up: Archaean, Purana, Dravidian, and Aryan Rock systems
2. Physiographic divisions
3. Drainage Systems: Himalayan and Peninsular
4. Climate: Types and characteristics; Significance of Indian Monsoon
5. Soil: Types, Characteristics and Distribution
6. Vegetation: Types and Classification

UNIT II: Economic and Social Geography

1. Agricultural regions, Green Revolution and its consequences
2. Industrial development since independence
3. Distribution of Minerals and Energy Resources: Iron, Bauxite, Coal and Petroleum

4. Water Resources of India; Inter-state conflicts
5. Regionalisation of India: Views of Spate and Bhatt
6. Human Resources: Population Distribution and population policies

Reference Books:

1.. Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.

2. Johnson, B. L. C., ed. 2001. Geographical Dictionary of India. Vision Books, New Delhi.

3. Mandal R. B. (ed.), 1990: Patterns of Regional Geography – An International Perspective. Vol. 3 – Indian Perspective.

4. Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India

5. Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.

6. Singh R. L., 1971: India: A Regional Geography, National Geographical Society of India.

7. Singh, Jagdish 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.

8. Spate O. H. K. and Learmonth A. T. A., 1967: India and Pakistan: A General and Regional Geography, Methuen.

9. Tirtha, Ranjit 2002: Geography of India, Rawat Publs., Jaipur & New Delhi

10. Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.

11. Tiwari, R.C. (2007) Geography of India. Prayag PustakBhawan, Allahabad

12. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur20. Thornbury, W. D. (I960)

GEOGRAPHY (MAJOR)

SEMESTER III

COURSE 2 (CODE: GEOG 3012)

COURSE TITLE: CARTOGRAPHY & SURVEYING (PR) **Credit: 5**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To impart knowledge about mathematical principles of maps, to gain knowledge to analyze maps and diagrams prepared using mathematical principles. To provide knowledge of using precision instruments for survey purposes.

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Learning Outcome: ● Preparation of maps and diagrams using different formula; measurement of height, distance, and area using the survey instruments.

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Professional Skill Development: ● Ability to assimilate and understand various maps, perform mathematical analysis and hands-on training of the instruments for professional skill enhancement.

Unit 1: Map Scales and Thematic Mapping

1. Concepts of Cartograms and Thematic Maps
2. Concept of Scale; Reduction and Enlargement of Scale
3. Construction of Scale: Plain, Comparative, Diagonal, and Vernier
4. Diagrammatic representation of data: Star and Age-sex pyramid diagram, Proportional Pie diagram, Ternary diagram.
5. Representation of data on a map by proportional circles, dots and spheres, isolines and Choropleth method, Chorochromatic maps.

6. Preparation and interpretation of Climograph, Hythergraph, Ergograph.

Unit 2: Surveying

1. Basics of surveying and survey equipment: Concepts of Bearing: magnetic and true; whole-circle and reduced.
2. Numerical problems related to traverse: calculation of Exterior and Interior angles, measurement of area.
3. Open and closed traverse survey using Prismatic Compass; Correction for closing error (Bowditch's method).
4. Drawing of the longitudinal profile and Contouring over closed traverse using Dumpy level and Digital levelling instrument.
5. Measurement of Height and distance of objects using Transit Theodolite (Accessible and Inaccessible bases) on horizontal plains with the same and different instrument heights.
6. Measurement of ground slope using Abney level. Determination of strike and dip using Brunton Compass.

Reference Books

1.. Cuff J. D. and Mattson M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books Dent B. D., T
2. organon J. S., and Holder T. W., 2008: Cartography: Thematic Map Design (6th Edition), McGraw-Hill Higher Education
3. Gupta K. K. and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi.
4. Kraak M.-J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
5. Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept, New Delhi.

6. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
7. Slocum T. A., Mcmaster R. B. and Kessler F. C., 2008: Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
8. Tyner J. A., 2010: Principles of Map Design, The Guilford Press.
9. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

GEOGRAPHY (MDC)

SEMESTER III

COURSE 1 (CODE: GEOG 3031)

COURSE TITLE: ENVIRONMENTAL GEOGRAPHY **Credit: 3**

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10 Marks)

Course Objective: ● The objectives of environmental geography are to impart basic knowledge about the environment and its allied problems and to create awareness about environmental problems among people.

Learning Outcome: ● Students shall develop an attitude of concern for the environment.

Professional Skill Development: ● This knowledge will help to develop awareness about local environmental quality.

ENVIRONMENTAL GEOGRAPHY **3 Credit**

1. Concepts and approaches of Environmental Geography
2. Structure and Functions of Ecosystem
3. Soil Pollution and Management
4. Solid Waste Pollution and Management
5. Marine Pollution and Management

Reference Books:

1. Casper J.K. (2010) Changing Ecosystems: Effects of Global Warming. Infobase Pub. New York.

2. Hudson, T. (2011) Living with Earth: An Introduction to Environmental Geology, PHI
3. Learning Private Limited, New Delhi.
4. Miller, G.T. (2007) Living in the Environment: Principles, Connections, and Solutions,
5. Brooks/ Cole Cengage Learning, Belmont.
6. Singh, R.B. (1993) Environmental Geography, Heritage Publishers, New Delhi.
7. UNEP (2007) Global Environment Outlook: GEO4: Environment for Development, United
8. Nations Environment Programme. University Press, Cambridge.
9. Wright R. T. and Boorse, D. F. (2010) Toward a Sustainable Future, PHI Learning Pvt Ltd, New Delhi.
10. Singh, R.B. and Hietala, R. (Eds.) (2014) Livelihood security in Northwestern Himalaya:
11. Case studies from changing socio-economic environments in Himachal Pradesh,

GEOGRAPHY (SEC)

SEMESTER III

COURSE 1 (CODE: GEOG 3051)

COURSE TITLE: BASICS OF RS & GIS **Credit: 3**

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10 Marks)

Course Objective: ● To provide knowledge about Remote Sensing and GIS technology-enabled information on natural and built environments.

Learning Outcome: ● Students will acquire knowledge about the mapping techniques in RS &GIS software and its use in various fields.

Professional Skill Development: ● This knowledge will help the students to enhance their skills in the preparation of digital maps for planning purposes.

Remote Sensing and GIS

1. Remote Sensing: Definition, Platforms, Types, Sensors and Resolution
2. Satellite Remote Sensing: Principles, EMR Interaction with Atmosphere and Earth Surface; Landsat and IRS Satellites: Sensors and Resolution
3. GIS: Definition, Data Structure (Vector and Raster), Applications
4. Downloading of satellite images and preparation of SFCC*
5. Georeferencing of Scanned Maps; Digitization of Point, Line, and Polygon features; Digitization of Administrative Boundaries*

[*Sub-units 4 and 5 are to be done using QGIS Software.

Note: A Project File Consisting of Practical Exercises is to be Submitted.]

Reference Books:

1. Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press.

2. Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.

3. Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.

4. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).

5. Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.

6. Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.

7. Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.

8. Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGraw-Hill.

GEOGRAPHY (MAJOR)

SEMESTER IV

COURSE 1 (CODE: GEOG 4011)

COURSE TITLE: CLIMATOLOGY **Credit: 5**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● Understanding the nature of the Earth's atmosphere and its different phenomena.

Learning Outcome: ● Students can explain different atmospheric phenomena and their impact on the environment.

Professional Skill Development: ● This knowledge will help to provide a foundation for further studies in climate and local resource management.

Unit 1: Elements of the Atmosphere

1. Nature, composition, and layering of the atmosphere,
2. Insolation: Latitude-wise variation of solar incidence. Depletion of Solar radiation within the atmosphere.
3. Heat balance (Terrestrial and Latitudinal), Heat budget.
4. Temperature: horizontal and vertical distribution. Inversion of temperature: types, causes, and consequences. Adiabatic temperature changes.
5. Stability and Instability of the atmosphere; Types of instability.
6. Greenhouse effect, importance of the Ozone layer and depletion.

Unit 2: Atmospheric Phenomena

1. Atmospheric moisture: Vapor pressure, Dew point and Saturation; Condensation: Processes and forms. Types of clouds.
2. Mechanism of Precipitation: Bergeron-Findeisen theory, Collision and Coalescence. Forms of Precipitation.
3. Air mass: Typology, origin, characteristics, and modification.
4. Circulation in the atmosphere: Planetary winds, Tri-Cellular model, Jet stream; 5. Monsoons: Origin and Mechanisms; Theories of Monsoon: Koteswaram, Jet Stream
6. Tropical and mid-latitude cyclones; Thunderstorms.

Reference Books:

1. Barry R. G. and Carleton A. M., 2001: Synoptic and Dynamic Climatology, Routledge, UK.
2. Barry R. G. and Chorley R. J., 1998: Atmosphere, Weather and Climate, Routledge, New York.
3. Critchfield H. J., 1987: General Climatology, Prentice-Hall of India, New Delhi
4. Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey.
5. Oliver J. E. and Hidore J. J., 2002: Climatology: An Atmospheric Science, Pearson Education, New Delhi.
6. Trewartha G. T. and Horne L. H., 1980: An Introduction to Climate, McGraw

GEOGRAPHY (MAJOR)

SEMESTER IV

COURSE 2 (CODE: GEOG 4012)

COURSE TITLE: ECONOMIC GEOGRAPHY **Credits: 5**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To instill fundamental ideas of Economic Geography, concept of resources and different economic activities

Learning Outcome: ● Students will acquire knowledge about economic theories and economic phenomena,

Professional Skill Development: ● Students will be able to evaluate different economic activities and aspects with more efficiency and this knowledge will help in the development of local economic enterprises.

Unit 1: Concepts and Approaches

1. Concepts and Approaches to Economic Geography
2. Concepts of Goods, Services, Production, and Consumption in Economic Geography
3. Resource: Concepts, significance and classification
4. Factors Influencing Location of Economic Activity and Forces of Agglomeration
5. Location Theories: Von Thünen and Alfred Weber
6. Resource depletion and Conservation, Limits to growth

Unit 2: Economic Activities

1. Concept and Classification of Economic Activities
2. Marketplace theories: Losch and Palander
3. Primary Activities: Subsistence and Commercial Agriculture; Forestry; Fishing
4. Secondary Activities: Manufacturing (Iron and Steel in India and Japan, Petrochemical in India and USA)
5. Tertiary Activities: Types of Trade and Services
6. International Trade Blocs: WTO and OPEC. SAARC, BRICKS.

Reference Books

1. Alexander J. W., 1963: Economic Geography, Prentice-Hall Inc., Englewood Cliffs, NewJersey
2. Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell
3. Hodder B. W. and Lee Roger, 1974: Economic Geography, Taylor and Francis Combes
4. P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press
5. Wheeler J. O., 1998: Economic Geography, Wiley
6. Durand L., 1961: Economic Geography, Crowell

GEOGRAPHY (MAJOR)

SEMESTER IV

COURSE 3 (CODE: GEOG 4013)

COURSE TITLE: MAP PROJECTION & MAP ANALYSIS (PR) Credit: 5

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To inculcate fundamental knowledge about projection methods, Topographical maps, and Geological maps.

Learning Outcome: ● Students shall gather ideas about the construction of map projection and their uses, they also learn to interpret Topographical maps and gain knowledge about geology through Geological maps.

Professional Skill Development: ● This knowledge will help to provide a foundation for further studies in Physical Geography or Earth Sciences.

Unit 1: Map projection

1. Coordinate Systems: Polar and Rectangular. Concept of Geoid and Spheroid.
2. Map Projections: Classification, Properties, and Uses. Concept and Significance of UTM Projection.
3. Concept of Generating Globe, Grids: Angular and Linear Systems of Measurement.
4. Construction of Projections: Polar Zenithal Stereographic, Simple Conical with two Standard Parallels, Bonne's, Cylindrical Equal Area, and Mercator's.

Unit 2: Topographical Maps and Geological Map

1. Survey of India Topographical Maps: Reference scheme of Old and Open series
2. Delineation of Drainage Basin from Survey of India Topographical Map. Concept of Relief, Slope, and Stream Order.
3. Construction and Interpretation of Relief Profiles (Superimposed, Projected and Composite),
4. Preparation of Maps for Relative Relief, Dissection Index, Slope map (Wentworth), Drainage Density and Stream Ordering (Strahler) on a Drainage Basin.
5. Elements of Geological map: Bedding Plane, Unconformity and Non-conformity, thickness of Bed, Dip, Throw, Hade, Heave.
6. Drawing of geological cross sections: Problems related to Horizontal, Uniclinal, Folded and Faulted structures.
7. Determination of True and apparent dip, identification of dip direction, thickness, and displacement (for faulted structures).
8. Interpretation of geological structures: correlation with topography, geological history.

Reference Books:

1. Anson R. and Ormelling F. J., 1994: International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
2. Gupta K.K. and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi.
3. Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi

4. Monkhouse F. J. and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London.
5. Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York
6. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
7. Sarkar, A. 2015: Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

COURSE STRUCTURE UNDER CCFUP (AS PER NEP 2020) FOR B.A/B.Sc. HONOURS IN GEOGRAPHY

Semester-wise distribution of Credits and marks

SEMESTER	COURSE TYPE WITH CODE	COURSE NAME	CREDIT	MARKS				DISTRIBUTION OF CREDIT		
				IA	ESE(TH)	ESE(PR)	TOTAL	LECT	TUTO	PR
V	**MAJOR/DS COURSE Code: GEOG5011**	GEOGRAPHICAL THOUGHT	**5**	**15**	**60**	**0**	**75**	**4**	**1**	**0**
	MAJOR/DS COURSE Code: GEOG5012	SOIL &BIOGEOGRAPHY	**5**	**15**	**60**	**0**	**75**	**4**	**1**	**0**
	MAJOR/DS COURSE Code: GEOG5013	QUANTITATIVE TECHNIQUES IN GEOGRAPHY (PR)	**5**	**15**	**0**	**60**	**75**	**0**	**0**	**5**
	MINOR COURSE# (Vocational Education and Training) Code: MSR5021 Or HRM5021 Or RSA5021	MEDICAL SALES REPRESENTATIVE Or HUMAN RESOURCE MANAGAMENT Or RETAIL SALES ASSOCIATE	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	INTERNSHIP FOR ALL		**2**	**PROJECT 30+ VIVA 20**			**50**	**0**	**0**	**2**
	TOTAL		**21**				**350**			
VI	**MAJOR/DS COURSE Code: GEOG6011**	GEOGRAPHY OF DEVELOPMENT	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MAJOR/DS COURSE Code: GEOG6012	SOCIAL AND CULTURAL GEOGRAPHY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MAJOR/DS COURSE Code: GEOG6013	REMOTE SENSING &GIS (PR)	**4**	**15**	**0**	**60**	**75**	**0**	**0**	**4**
	MAJOR/DS COURSE Code: GEOG6014	FIELD REPORT (PR)	**4**	**15**	**0**	**60**	**75**	**0**	**0**	**4**
	MINOR COURSE# (Vocational Education	MEDICAL SALES REPRESENTATIVE	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**

	and Training) **Code: MSR6021** **Or** **HRM6021** **Or** **RSA6021**	Or HUMAN RESOURCE MANAGAMENT Or RETAIL SALES ASSOCIATE								
	TOTAL		**20**				**375**			

**** IA- INTERNAL ASSESSMEN, ESE-END SEMESTER EXAMINATION, TUTO-TUTORIAL, LECT- LECTURE, TH-THEORY, PR- PRACTICAL**

 # STUDENTS OPTED GEOGRAPHY AS MAJOR SUBJECT (4 YR HONS. COURSE/ 3YR DEGREE COURSE) WILL STUDY ANY DISCIPLINE OTHER THAN GEOGRAPHY AS SPECIFIED BY THE UNIVERSITY/AS PER NEP STRUCTURE IN THEIR MINOR AND MULTIDISCIPLINERY COURSES.

GEOGRAPHY (MAJOR)
SEMESTER V
COURSE 1 (CODE: GEOG 5011)

COURSE TITLE: GEOGRAPHICAL THOUGHT **Credits: 5**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● The course enables students to understand the philosophical foundation of geography as a discipline as well as builds a strong base for academic research and professional practice in geography.
Learning Outcome: ● Helps students to understand the evolution of geography as a discipline and develops the power of critical thinking which enhances research skills and prepares for advanced studies.
Professional Skill Development: ● The developed power of critical thinking and analytical skills enhances communication and problem-solving abilities for professional works in geography related fields.

Unit: 1

1. Nature and Scope of Geography; Geography as a Spatial Science
2. Geography in Ancient Period: Greek, Roman and Indian
3. Development of Geography in Medieval period: Contributions of Arab Geographers
4. German School of Thought
5. French School of Thought
6. British and American School of Thought

Unit: 2

1. Concept of Determinism, Possibilism and Neo-Determinism
2. Positivism and Quantitative Revolution
3. Behavioural Geography
4. Approaches to the study of Geography: Ideographic vs Nomothetic
5. Approaches to the study of Geography: Systematic vs Regional
6. Humanistic and Welfare Geography

Suggested Readings: Geographical Thought

1. Adhikari S. 1992, Geographical Thought. Chaitanya Pub. House. Allahabad.
2. Binege. W. 1962, Theoretical Geography. Glenerp. London.
3. Chorley. R.J. and Hagget. P. (eds) 1965, Frontiers in Geographical Teaching. OUP. Oxford.
4. Dikshit. R.D. (eds) 1994, The Art and Science of Geography: Selected Readings. Prentice Hall India. New Delhi.
5. Dunbar. G.S. (eds) 1991, Modern Geography: An Encyclopedic Survey. St. James Press. Chicago
6. Gregory D. and Walford. R. (eds) 1988, Horizons in Human Geography, Macmillan London.
7. Hussain. M. 1995, Evolution of Geographical Thought, 3rd edition, Rawat Pub. Co., New Delhi.
8. Johnston. R.J. Gregory. D. Prett. G and Watts. M. 2000, The Dictionary of Human Geography. 4th edition. Blackwell Pub. Ltd. London.
9. Lahiri-Dutt, K. BhugolChintarBikash, World Press
10. Matthews. J.A. and Herbert. J.A. 2004, Unifying Geography: Common Heritage, Shared Future? Routledge. London.
11. Messy D. and Allen J. (eds) 1984, Geography Matters: A Reader, Cambridge University Press Cambridge.
12. Peet. R. 1998, Modern Geographical Thought. Blackwell, London.
13. Stoddart. D.R. 1986, On Geography and its History. Basil Blackwell, Oxford19.

SEMESTER V
GEOGRAPHY (MAJOR)
COURSE II (CODE: GEOG 5012)

COURSE TITLE: SOIL AND BIOGEOGRAPHY **Credits: 5**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To inculcate fundamental knowledge about Soil Geography and basic concepts in Biogeography.

Learning Outcome: ● Students shall gather ideas about the factors of soil formation, its type, distribution and different properties. They also gather knowledge about the principles of Biogeography and its different components.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Pedology and Biogeography or Ecology.

UNIT I: SOIL GEOGRAPHY

1. Soil as a component of biosphere, Factors of soil formation, Pedogenic processes and development of soil profile
2. Soil properties: Physical (Texture, Structure, Colour, Moisture, Air, Porosity) and Chemical (pH, Organic matter, NPK and Cation Exchange Capacity)
3. Soil Organisms: Macro and Micro
4. Study of soil profiles: Podzol, Laterite, Chernozem; Concept of Soil Catena.
5. Soil classification: Genetic and USDA
6. Soil erosion: Types, Consequences and Conservation, Soil Pollution: Causes, Consequences and Amelioration

UNIT II: BIOGEOGRAPHY

1. Nature and Scope of Biogeography, Concepts of Biosphere, Ecosystem, Biome, Species, Population, Community, Ecotone, Habitat, Ecological Niche, Biodiversity
2. Energy flow in Ecosystem: Trophic Level, Ecological pyramids, Y-shaped and universal model of energy flow
3. Bio-Geo Chemical Cycle: Carbon, Nitrogen
4. Biodiversity: Types, Gradients, Hotspots, Loss and Conservation
5. Classification of Biome; Tropical Rainforest, Temperate Grassland and Tundra
6. Programs of Conservation: IBP, MAB and IUCN

Suggested Readings:

Soil Geography:

1. Biswas, T.D. and Mukherjee, S.K. 1987, Text book of Soil Science. Tata-McGraw-Hill.
2. Brady. N.C. and Weil. R.R. 1996, The Nature and Properties of Soil. 11th edition. Longman. London.
3. De N K and P Ghosh, 2013, Geography of Soils, Shribhumi Publishing House, 101B, Sitaram Ghosh Street, Kolkata - 700009
4. Floth. H.D. 1990, Fundamentals of Soil Science, 8th edition. John Wiley and Sons. New York.
5. Morgan. R.P.C. 1995, Soil Erosion and Conservation, 2nd edition. Longman. London. Schwab. G.O. Fandmeir. D.D. and Eliot, W.J. 1996, Soil and Water Management Systems, 4th edition, John Wiley and Sons Inc. New York.
6. Young. A. 2000, Land Resources: Now and for the Future, Cambridge University Press. Cambridge.

Biogeography:

1. Chapman J.L. and Reiss. J.J. 1993, Ecology: Principles and Applications, Cambridge University Press, Cambridge.
2. Chiras D.D. Reganold J.P. and Owen, O.S. 2002, Natural Resource Conservation. Management for a Sustainable Future. 8th edition, Prentice Hall. Englewood Cliffs.
3. Dash. M.C. 2001, Fundamentals of Ecology, 2ndedtion, Tata McGraw-Hill, New Delhi.
4. Huggett. R. 1998, Fundamentals of Biogeography, Routeledge. London.
5. Kormondy. E.J. 1996, Concepts of Ecology, 4th edition. Prentice-Hall, India. New Delhi. 6. Myers. A.A. AND Giller. P.S. (editors) 1988, Analytical Biogeography: An Integrated Approach to the study of Animal and Plant Distributions. Chapman and Hall. London.
7. Odum E.P. 1997, Ecology: A Bridge between Science and Society, Sinaur Associates Inc. Publishers, Sunderland.
8. Sharma P.D. 1996, Ecology and Environment, 7th edition, Rastogi Publications, Mirat.
9. Weddell, B.J. 2002, Conserving Living Natural Resources in the Context of a Changing
10. World. Cambridge University Press. Cambridge. World Wide Fund for Nature-India (Eastern Region) 1995, Nature Conservation Handbook. Calcutta.

SEMESTER V
GEOGRAPHY (MAJOR)
COURSE III (CODE: GEOG 5013)

COURSE TITLE: QUANTITATIVE TECHNIQUES IN GEOGRAPHY (Practical) **Credits: 5**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Duration of Practical Examination: 4 hrs

Course Objective: ● To describe and analyses the quantitative geographical information and the probability of outcomes of an event or an area.

Learning Outcome: ● Students shall gather the knowledge about the statistical techniques to solve the geographical problems of an event. They also learn different statistical techniques to solve the problems.

Professional Skill Development: ● This knowledge will help to provide the fundamental foundation for further studies in research.

Unit 1

1. Sources and Types of Data; Variables and Attributes
2. Population and Samples, Scales of measurement (nominal, ordinal, interval and ratio)
3. Tabulation: Construction of data matrix with each row representing an aerial unit (districts / blocks /mouzas / towns) and corresponding columns of relevant attributes
4. Frequency distribution: Histogram, Curve, Polygon and Ogive
5. Measures of Central tendency: Mean, median, mode, Partition values (Deciles and Percentiles)
6. Measures of Dispersion: Mean Deviation, Standard Deviation, Coefficient of Variation, Standard Score

Unit 2

1. Scatter Diagram and trend line fitting with eye estimation
2. Coefficient of Correlation: Product Moment Correlation, Rank Correlation
3. Yule's Coefficient of Association
4. Linear Regression and fitting of best fit line with least square method, Estimation of Standard Error
5. T-Test and Chi-Square test
6. Time series analysis

***A Project File consisting of practical exercises on the above themes is to be submitted.**

Suggested Readings: Quantitative Techniques in Geography

1. Berry B. J. L. and Marble D. F. (eds.): Spatial Analysis – A Reader in Geography.

2. Ebdon D., 1977: Statistics in Geography: A Practical Approach.

3. Hammond P. and McCullagh P. S., 1978: Quantitative Techniques in Geography: An Introduction, Oxford University Press.

4. King L. S., 1969: Statistical Analysis in Geography, Prentice-Hall.

5. Mahmood A., 1977: Statistical Methods in Geographical Studies, Concept.

6. Pal S. K., 1998: Statistics for Geoscientists, Tata McGraw Hill, New Delhi.

7. Sarkar, A. (2013) Quantitative geography: techniques and presentations. Orient Black Swan Private Ltd., NewDelhi

8. Silk J., 1979: Statistical Concepts in Geography, Allen and Unwin, London.

9. Spiegel M. R.: Statistics, Schaum's Outline Series.

10. Yeats M., 1974: An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

SEMESTER VI
GEOGRAPHY (MAJOR)
COURSE I (CODE: GEOG 6011)

COURSE TITLE: GEOGRAPHY OF DEVELOPMENT **Credits: 4**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ●This course is going to establish understanding about development and growth. It focuses on human development with sustainability and aspiring to quality of life. It can inculcate community development, rural development and urban growth aiming to development.

Learning Outcome: ● Students shall acquire ideas about the growth and development and their indicators. They shall able to identify sustainable development goals. Learners shall obtain responsiveness about development in different sectors such as community level and regional level.

Professional Skill Development: ● This knowledge will help to measure human development and sustainable development through different approaches and methods. Students will develop expertise to measure quality of life index through which students can assess the stages of development

UNIT I

1. Concept of Development; Growth vs Development
2. Indicators of development
3. Human Development: Concept and its measurement
4. Concept of Sustainable Development; SDGS 2030: Goals, Measurement and Monitoring
5. Development, Equity and Inclusivity
6. Development and Gender

UNIT II

1. Community Development: Approaches and Processes
2. Quality of Life: Approaches, Measurement and Significance
3. Concept of Rural Development; Dimensions and Components of Rural Development
4. Rural Development programme in India: Sansad Adarsh Gram Yojana (SAGY)
5. Urban agglomeration, City region and Urban fringe
6. Sustainable city; Salient Features of Smart City Mission

Suggested Readings: Geography of Development

1. Ahuja R. (2001): Social problem in India Rawat Publication
2. Aziz, S. (1978): Rural Development-Learning from China, English language Book society and Macmillan
3. Biswas, A.K., Jortajada, C., (2006): Appraising Sustainable Development, Oxford University
4. Corbridge, Stuart (ed.). (1995): Development studies-A Reader, Arnold, London
5. Dreze.J and Sen A. (1996): Economic Development and Social Opportunity, Oxford University Press, New Delhi
6. Elliotte, j. A. (1994): An Introduction to Sustainable Development: The Developing World, Routledge, London.
7. Gehlawat, J.K. and Kant, K., (1987): Strategies for Rural Development, Arnold Publishers
8. Gerald, M. &Roucc, J. (2003): Leading Issues in Economic Development, OUP
9. Gill, R. (1975): Economic Development: Past and Present, Prentice-Hall of India, New Delhi
10. Gilpin, A. (1996): Dictionary of Environment and Sustainable Development, John Wiley and Sons Ltd., Chichester:
11. Guha R. (ed.). (1994): Social Ecology, OUP, New Delhi.
12. Gupta D.N., (2001): Rural Development Systems, Population India International
13. Herbert, David and Thomas, C. (1982): Urban Geography A First Approach, Jhon Wiley & Sons, New Delhi
14. Hooja, R. (1987): Administrative interventions in Rural Development, Rawat Publications, Jaipur
15. Lebra, Joyce et al. (ed.). (1984): Women and Work in India-Community and Change, Pramila & co. Publishers
16. Meier, G., Rauch, J. (2003): Leading Issues in Economic Development, Oxford University Press
17. Middleton, N & Keefe, P.O. (2001): Redefining Sustainable Development, Pluto Press, London, Sterling & Virginia.
18. Mohan, S. (2005): Urban Development and New Localism, Rawat Publications, Jaipur
19. Moore R. (1995): Sustainable Development, New Age International.
20. Peet, R. and Hartwick, E. (1999): Theories of Development, Rawat Publications
21. Powar, M. (2003): Rethinking Development Geographies, OUP
22. Rao, P.K. (2001): Sustainable Development, Blackwell Publishers
23. Raza, M. (1992): Development & Ecology, Rawat Publication
24. Sharma, R.N. and Sita, K. (2001): Issues in Urban Development, Rawat Publications, Jaipur.
25. Shaw, A. (2018): Towards Sustainable Cities in India' in J. Mukherjee (ed.) Sustainable Urbanization in India: Challenges and Opportunities. New Delhi: Springer

26. Singh, K. (1986): Rural Development: Principles, Policies and Management, Sage Publication New Delhi
27. Singh, M. and Sharma, R.N. (1978): Rural Development-A Select bibliography, Uppal Publishing House
28. Venkateswaran, S. (1995): Environment, Development and the Gender Gap, Sage, New Delhi

SEMESTER VI
GEOGRAPHY (MAJOR)
COURSE II (CODE: GEOG 6012)

COURSE TITLE: SOCIAL AND CULTURAL GEOGRAPHY **Credits: 4**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To develop an understanding of how social and cultural processes shape spaces and places, enhance critical thinking about identity, power, and diversity, and apply geographical perspectives to real-world social issues.

Learning Outcome: ● To develop an understanding of how social and cultural processes shape spaces and places, enhance critical thinking about identity, power, and diversity, and apply geographical perspectives to real-world social issues.

Professional Skill Development: ● To develop professional skills such as critical thinking, spatial analysis, cultural sensitivity, research methods, communication, and the ability to interpret social patterns and human-environment interactions.

UNIT 1: Social Geography:

1. Concept and Elements of Social Structure
2. Social System and Social Processes
3. Social Exclusion and Inequality
4. Concept and Indicators of Social Well-being, Quality of Life
5. Social Ecology and Social Pathology
6. Social Security and Social Justice

Unit 2: Cultural Geography

1. Definition, Scope and Content of Cultural Geography
2. Concept of Cultural Hearth, Realm, Cultural Landscape
3. Cultural Innovation, Diffusion and Assimilation
4. Cultural Segregation, Cultural Diversity and Acculturation
5. Major Races of the World: Distribution and characteristics
6. Cultural identity, Cultural Hegemony and conflicts

Suggested Readings: Social & Cultural Geography

1. Ahmad, A. (1999): *Social Geography*, Rawat Publications, Jaipur and New Delhi

2. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi

3. Casino, V.J.D., Jr., (2009): *Social Geography*: A Critical Introduction, Wiley-Blackwell, Chichester

4. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): *Geography and Inequality*, Oxford University Press, Oxford and London

5. Dubey. S.C. (1991): *Indian Society*, National Book Trust, New Delhi

6. Eyles, J. (ed.) (1986): *Social Geography in International Perspective*, Rowman and Littlefield, New Jersey and Los Angeles

7. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London

8. Haq, M. (2000): *Reflections on Human Development*, Oxford University Press, New Delhi

9. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London

10. Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities,* Oxford University Press, Toronto

11. Rubenstein, J.M. (2002), *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs

12. Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi

13. Smith, D. (1977): *Geography: A Welfare Approach*, Edward Arnold, London

14. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, U.K

SEMESTER VI
GEOGRAPHY (MAJOR)
COURSE III (CODE: GEOG 6013)

COURSE TITLE: REMOTE SENSING AND GIS (Practical) **Credits: 4**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks).

Duration of Practical Examination: 4 hrs.

Course Objective: The objective of this course is to gain an understanding of basic cartographic issues and GIS concepts, and their use in a specific GIS application. Moreover, after completion of the course students have gained understanding of the purposes of cartography, recognize the elements of cartographic representation, and how maps work.

Learning Outcome: To perform sophisticated raster and vector GIS analysis in a GIS environment and solve spatial problems using GIS techniques and technology. CO3: To develop a broad appreciation of spatial analysis techniques and application areas. To experiment with different symbologies to develop qualitative, quantitative and multivariate traditional and non-traditional maps.

Professional Skill Development: This knowledge will help the students to enhance their skills in the preparation of digital maps for planning purposes. It also will help the job opportunities in the deferent sector.

Unit I:

1. Interaction of EMR with atmosphere and earth's surface; Spectral signature curve: Soil, Vegetation and Water bodies
2. Optical mechanical scanners: MSS, TM, LISS, WiFS and PAN
3. Satellites and their characteristics: LANDSAT, IRS, INSAT and NOAA
4. Photogrammetry and its application, Types and Geometry of aerial photographs
5. Principles of GNSS, Navigation with Indian Satellite Constellation (NaVIC), GPS measurements and accuracy
6. GIS and its applications

Unit II:

1. Digitization of administrative boundary with attribute table
2. Creation of Thematic Mapping by using attribute table

3. Creation of Buffer Zone: Point and Line
4. Supervised and Unsupervised Image Classification from the LANDSAT and Sentinel Data
5. Drainage Basin demarcation, extraction and mapping of stream order and stream frequency from SRTM data
6. GPS way point collection and Mapping

***Unit II is to be done using QGIS Software.**
 # A Project File consisting of practical exercises on the above themes is to be submitted.

Suggested Readings: Remote Sensing and GIS

1. Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press.
2. Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
3. Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.
4. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
5. Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
6. Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
7. Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.
8. Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGraw-Hill.
9. P.A. Burrough and R.A. McDonnell, “Principles of Geographical Information systems”, Oxford University Press.
10. C.P. Lo and K.W. Yeung, “Concepts and Techniques of Geographic Information Systems”, Pearson Education.
11. P.A.Longley, M.f.Goodchild, D.J.Maguireand D.W. Rhind, “Geographical Information system and Science (3rd Edition)”, John Wiley.
12. S. Sekhar and H. Xiong, “Encyclopedia of GIS”, Springer International Publishing. 5. T. P. Kanetkar, S. V. Kulkarni, “Surveying and Levelling Vol I and II”, Vidyarthi Griha Prakashan
13. R.C. Gonzales and R.E. Woods, “Digital Image Processing (2nd Edition)”, Pearson Education.

SEMESTER VI
GEOGRAPHY (MAJOR)
COURSE IV (CODE: GEOG 6014)

COURSE TITLE: FIELD WORK (Practical) **Credits: 4**

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks).

Question Pattern: Report writing: 30, Viva-voce:10, two questions to be set each of 10 marks (10x2=20).
Internal Assessment: Marks should be awarded on the basis of student's active participation during field visit and post field activities. (Strictly for this paper).
Duration of Practical Examination: 4 hrs.

FIELDWORK

Students are required to carry out a comprehensive field work in a village/mouza/town/C.D. Block/drainage basin selecting a particular research problem. There should be a clear-cut Problem background, major Objectives, Methodology and Findings. The text of the fieldwork should not exceed 5000 words. The fieldwork along with the diagrams and illustrations should be prepared in a computer using the standard (Using MS-Word for typing and Excel for calculation and graphs). The cartographic and statistical techniques used in the fieldwork should be at par with the syllabus of the UG Course.

Guidelines for Fieldwork:

The following methods are to be followed for fieldwork:

1) Preparation of questionnaire for assessing the physical/cultural/environment/socio-economic components. A filled-in questionnaire used in the survey should be attached with the report signed by the concerned teacher and the student.
2) Preparation of maps using QGIS, it is preferred that RS data should be used in field report.
3) Preparation of charts/graphs in MS-Excel (duly labelled).
4) The report should be typed in MS-Word. The font size is fixed at 12 in Times New Roman and the line spacing 1.5.
5) Each field work should have a certificate of authenticity duly signed by the project Supervisor.

Semester-wise and Course wise Distribution of Credit & Marks under CCFUP as per NEP, 2020

SEMESTER	Course Type	Code	Name of the Course	Credit	L – T - P	Marks	Marks Dist. Th. – Pr. - IA
VII	Major/Core Course	GEOG 7011	PHILOSOPHY OF GEOGRAPHY & INDIAN KNOWLEDGE SYSTEM	6	5-1-0	75	60 –00 – 15
	Major/Core Course	GEOG 7012	ADVANCED PHYSICAL GEOGRAPHY	6	5-1-0	75	60 – 00 – 15
	Major/Core Course	GEOG 7013	ADVANCED HUMAN GEOGRAPHY	6	5-1-0	75	60 –00 – 15
	Major/Core Course	GEOG 7014	REMOTE SENSING & GIS APPLICATIONS	6	0-0-6	75	00–60 – 15
	Minor Course	GEOG 7021	ENVIRONMENTAL ISSUES IN GEOGRAPHY & CLIMATE CHANGE	4	3-1-0	75	60 – 00 – 15
	Total			**28**		**375**	
VIII Hons. With Research Project/ Dissertation	Major/Core Course	GEOG 8011	RESEARCH METHODOLOGY IN GEOGRAPHY	6	5-1-0	75	60–00 – 15
	Minor Course	GEOG 8021	GEOINFORMATICS AND SPATIAL INFORMATION TECHNOLOGY	4	3-1-0	75	60 – 00 – 15
	Research Project/ Dissertation	GEOG 8091		12	0- 0- 12	225	Seminar Presentation, Preparation & Submission of Research Project/Dissertation-135 + Viva-90
	Total			**22**		**375**	

OR

VIII Hons.	Major/Core Course	GEOG 8011	RESEARCH METHODOLOGY IN GEOGRAPHY	6	5-1-0	75	60– 00 – 15
	Major/Core Course	GEOG 8012	CONTEMPORARY ISSUES IN PHYSICAL GEOGRAPHY	4	3-1-0	75	60 – 00 – 15
	Major/Core Course	GEOG 8013	CONTEMPORARY ISSUES IN HUMAN GEOGRAPHY	4	3-1-0	75	60 – 00– 15
	Major/Core Course	GEOG 8014	QUANTITATIVE TECHNIQUES IN GEOGRAPHY & THEMATIC	4	3-1-0	75	00– 60– 15

			MAPPING				
	Minor Course	**GEOG 8021**	GEOINFORMATICS AND SPATIAL INFORMATION TECHNOLOGY	4	3-1-0	75	60 – 00 – 15
	Total			**22**		**375**	
	Grand total (Sem. I -VIII)			**178**		**3075**	

SEMESTER VII
COURSE1(CODE:GEOG7011)
COURSE TITLE: PHILOSOPHY OF GEOGRAPHY AND INDIAN KNOWLEDGE SYSTEM

Credits:6

Lecture hours: 90 Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to make the students aware about how the subject of geography has over time and what are the recent trends in geography. Also, the curse has been designed so as to ensure that students are aware about the relevance of the Indian Knowledge System within the discipline of geography.

Learning Outcome:
After learning this course, the student is expected to be aware about the recent geographical thinking across the world. Also, the students are expected to understand the context and significance of the Indian Knowledge System which may help in undertaking newer research initiatives on the Indian Knowledge System and geography.

Professional Skill Development:
The student is expected to acquire knowledge in these fields which may help in critical thinking and demonstration skills in geography-related environment.

UNIT I: Foundations and Conceptual Developments in Geography Lecture Hours: 20

1. Basic Concepts: Spatial Praxis, Human-Environment Relationship
2. Space, Place and Locale in Geography, Concepts of Physical and Social Space (Ideas of Soja & Lefebvre)
3. Areal Differentiation and Paradigm Shift in Geography: Dualism and Dichotomy in geography

UNIT II: Philosophical and Contemporary Perspectives in Geography Lecture Hours: 25

4. Classical and Scientific Traditions: Encyclopedism, Positivism, Post-Positivism
5. Human-centred Approaches in Geography: Behavioralism, Radicalism, Humanistic, Welfare Geography, Geography of Gender
6. Critical and Post-Modern Perspectives of Space and Geography: Ideas of David Harvey, Basic ideas of Homogenization, Third Space, Time-Space Compression, Plurality & Complexity, Marginality to Diasporic Identity, Critical Geography, Hybrid Geography

UNIT III: Indian Knowledge Systems and Environmental Thought Lecture Hours: 20

7. Ancient Indian Philosophy and Culture, Vedic and Vedantic Views on Environment, Ancient Indian map making
8. Buddhist Concept of Ecology: Concepts of Pratityasamutpada, Santutti, Ahimsa, Lobha, Vinaya, Buddhist Holy Texts and Environmental Consciousness (Jataka Tales &Tripitakas)
9. Sacred Ecology and Conservation Traditions: Sacred Groves and Deep Ecology of major tribal groups of India

UNIT IV: Indigenous Geographical Knowledge and Regional Concepts Lecture Hours: 25

10. Traditional Resource Management and Settlement Planning: Indigeneous practices of soil & water conservation, Urban Planning in the Harappan Civilization, Settlement Planning in ancient India
11. Cosmology, Geography and Navigation in IKS: Universe as a Dynamic Entity (Jagat & Brahmanda), Bhuvidya (Bhugol-Khogol Differentiation, Equator (Niraksha) and Prime Meridian through Ujjain (Avanti), Development of navigation science in the IKS, Use of Matsya Yantra (Compass)
12. Regional Geography in Indian Knowledge Systems, Division of World into Seven Continents (Dwipa), Concept of Bharatvarsha: Desha and Janapada, NadiStuti Hymn in Rig Veda

SUGGESTED READINGS:

1. Adhikari S. 1992, Geographical Thought. Chaitanya Pub. House. Allahabad.
2. Cajete, G. (2000). Native science: Natural laws of interdependence. Clear Light Publishers.
3. Crampton, J. W., & Elden, S. (Eds.). (2016). Space, knowledge and power: Foucault and geography. Routledge.
4. Datta, A., Hopkins, P., Johnston, L., Olson, E., & Silva, J. M. (Eds.). (2020). Routledge handbook of gender and feminist geographies. Routledge.
5. Dikshit. R.D. (eds) 1994, The Art and Science of Geography: Selected Readings. Prentice Hall India. New Delhi.
6. Eck, D. L. (2012). India: A sacred geography. Harmony Books.
7. Elverskog, J. (2020). The Buddha's footprint: An environmental history of Asia. University of Pennsylvania Press.
8. Gadgil, M., & Guha, R. (1992). This fissured land: An ecological history of India. University of California Press.
9. Gole, S. (1989). Indian maps and plans: From earliest times to the advent of European surveys. Manohar Publications.
10. Harvey, D. (2001). Spaces of capital: Towards a critical geography. Edinburgh University Press.
11. Henderson, G., & Waterstone, M. (Eds.). (2009). Geographic thought: A praxis perspective. Routledge.
12. Hubbard, P., & Kitchin, R. (Eds.). (2010). *Key Thinkers on Space and Place* (2nd ed.). SAGE Publications.
13. Hussain. M. 1995, Evolution of Geographical Thought, 3rd edition, Rawat Pub. Co., New Delhi.
14. Johnston. R.J. Gregory. D. Prett. G and Watts. M. 2000, The Dictionary of Human Geography. 4th edition. Blackwell Pub. Ltd. London.
15. Kenoyer, J. M. (1998). Ancient cities of the Indus Valley Civilization. Oxford University Press.
16. Kimmerer, R. W. (2013). Braiding sweetgrass: Indigenous wisdom, scientific knowledge and the teachings of plants. Milkweed Editions.
17. Kosambi, D. D. (1965). The culture and civilisation of ancient India in historical outline. Routledge & Kegan Paul.
18. Law, B. C. (1954). Historical geography of ancient India. Société Asiatique de Paris.
19. Lefebvre, H. (1991). *The Production of Space* (D. Nicholson-Smith, Trans.). Wiley-Blackwell. (Original work published 1974)
20. Legg, S. (2007). Spaces of Colonialism. UK: Blackwell Publishing.
21. Loy, D. R. (2019). Ecodharma: Buddhist teachings for the ecological crisis. Wisdom Publications.
22. Maiti, R., and Maiti, M.M. 2021, Development of Geographical Thought: Contextualization and Synthesis of Philosophies, Nobodaya Publications, Kolkata.
23. Maiti, R., and Maiti, M.M. 2023, *Bhugol Chinta o Darshan,* Nobodaya Publications, Kolkata.
24. Massey, D. (1994). Space, Place and Gender. Minnesota: University of Minnesota Press.
25. Nugteren, A. (2005). Belief, bounty, and beauty: Rituals around sacred trees in India. Brill.
26. Prime, R. (2002). Vedic ecology: Practical wisdom for surviving the 21st century. Mandala Publishing.
27. Rangarajan, M. (2015). India: An environmental history: From earliest times to the twenty-first century. Orient BlackSwan.
28. Rose, G. (1993). Feminism and geography: The limits of geographical knowledge. University of Minnesota Press.
29. Sahni, P. (2008). Environmental ethics in early Buddhism: A virtues approach. Routledge.
30. Shiva, V. (1989). Staying alive: Women, ecology, and development. Zed Books.
31. Smith, N. (1984). Uneven development: Nature, capital, and the production of space. Blackwell.
32. Soja, E. W. (1989). Postmodern geographies: The reassertion of space in critical social theory. Verso.

33. Soja, E. W. (1996). Thirdspace: Journeys to Los Angeles and other real-and-imagined places. Wiley-Blackwell.
34. Tiwari, S. (2009). Environmental awareness in Vedic literature. Pratibha Prakashan.
35. Tuan, Y.-F. (1977). Space and Place: The Perspective of Experience. University of Minnesota Press.
36. Unnikrishnan, E. (1995). Sacred groves of north Kerala: An ecofolklore study. Jeevarekha
37. Vannucci, M. (1994). Ecological readings in the Veda. D.K. Printworld.
38. Verma, L. R. (1998). Indigenous technology knowledge for watershed management in upper north-west Himalayas of India. Central Soil and Water Conservation Research and Training Institute.
39. Whatmore, S. (2002). Hybrid geographies: Rethinking the 'human' in human geography. SAGE Publications.
40. Wright, R. P. (2010). The ancient Indus: Urbanism, economy and society. Cambridge University Press.

COURSE2 (CODE: GEOG7012)

COURSE TITLE: ADVANCED PHYSICAL GEOGRAPHY
Credits:4
Lecture hours: 90 Total Marks:75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15Marks)

Course Objective:
The primary objective of the course is to make the students ready on the recent trends in physical geography and their societal applications. This is significant as the students may be aware about the advanced physical geographical concepts before undertaking nay kind of research.

Learning Outcome:
After learning the course, the student is expected to have a clear understanding of the recent advances in physical geography which include geomorphology, climatology, pedology and water management.

Professional Skill Development:
The student is expected to develop their skills and expertise in analysing the landforms and the processes involved, climate and their determinants (locally and globally), soil dynamics and conservation and comprehend their role as experts in managing the resource of water.

UNIT I: Advances in Geomorphology Lecture Hours: 25

1. Basic Concepts of Threshold, Equilibrium, Grade and Systems Approach, River Morphodynamics (e.g. Process–Form Feedbacks, Nonlinear Dynamics and Complexity, River Resilience and Restoration)
2. Active Tectonics and Landscape Evolution, Tectonic Control on Drainage Development, River Terraces, Knickpoints and Geomorphic Indicators of Neotectonic Activity
3. Delta and Deltaic Environments with special reference to Ganga-Brahmaputra Delta (GBD)

UNITII: Advances in Climatology Lecture Hours: 20

1. Adiabatic Temperature Changes in the Atmosphere, Vorticity, Climatic Classification (Thornthwaite)
2. Indian Monsoon and its Mechanism (Modern Theories), ENSO and Indian Ocean Dipole
3. Basic Ideas of Climate Change, Natural (Milankovitch Cycles) and Anthropogenic Determinants

UNITIII: Advances in Pedology Lecture Hours: 25

1. Soil Dynamics: Ion Exchange, Structure of Organic and Inorganic Clay, Clay-Humus Complex, Bio-functions of soil
2. Soil Moisture: Forms, Storage and Movement in Soils, Soil Water Potential and Soil Moisture Regimes, Field Capacity, Permanent Wilting Point and Available Water Capacity

3. Essential Plant Nutrients: Macro and Micro Nutrients, Soil Fertility Evaluation and Sustainable Soil Fertility Management

UNIT IV: Advances in Water Management **Lecture Hours: 20**

1. Drainage Basin Hydrology: Relief, Surficial, Linear and Shape Aspects; Basin Hydrological Cycle; Models of estimating Surface Runoff (Rational Method and SCS-CN)

2. Occurrence & Movement of Groundwater, Velocity, Viscosity, Hydraulic Conductivity & Darcy's Law

3. Managing Water Resources: Watershed Management, Rainwater Harvesting

SUGGESTED READINGS:

1. Barry, R.G. and Chorley, R.T. 1992: Atmosphere, Weather and Climate, 6th edition, Routledge, London
2. Biswas, T.D. and Mukherjee, S.K. 1987: Textbook of Soil Science, Tata-McGraw-Hill.
3. Brady, N.C. and Weil, R.R. 1996: The Nature and Properties of Soil, 11th edition, Longman, London.
4. Brigg, G.R. 1996: The Ocean and Climate, Cambridge University Press, Cambridge
5. Bradley, R. S. (2015). Paleoclimatology: Reconstructing climates of the Quaternary (3rd ed.). Academic Press.
6. Burbank, D. W., & Anderson, R. S. (2012). Tectonic geomorphology (2nd ed.). Wiley-Blackwell.
7. Chorley, R., Schumm, S. and Sugden, D.E. 1994. Geomorphology, Methuen, London
8. Coleman, D.C. and Crossby, J. 1996: Fundamentals of Soil Ecology, Academic Press, San Diego Floth, H.D. 1990: Fundamentals of Soil Science, 8th edition, John Wiley and Sons, New York
9. Cook and Doorncamp. 1988. Geomorphology in Environment Management, London
10. Crosato, A. (2009). River morphodynamics: An introduction to alluvial processes. CRC Press.
11. Das, G. K. (2015). Estuarine morphodynamics of the Sunderbans, Springer
12. Das, P.K. 1995: Monsoons, 2nd edition, National Book Trust, New Delhi
13. Dey, S. (2014). Fluvial processes: Solutions to regional and global problems. Springer. https://doi.org/10.1007/978-3-642-19062-9
14. Dury, G.H.,1967, Essays in Geomorhology, Heinemann Educational Books Ltd, London
15. Ellis, S. and MelIor, R. 1995: Soils and Environment, Routledge, London
16. Gardiner, V. (1975). Drainage basin morphometry. Geo Abstracts Ltd.
17. Gliessman, S. R. (2014). Agroecology: The ecology of sustainable food systems (3rd ed.). CRC Press.
18. Havlin, J. L., Tisdale, S. L., Nelson, W. L., & Beaton, J. D. (2020). Soil fertility and nutrient management (8th ed.). CRC Press.
19. Heathcote, I. W. (2009). Integrated watershed management: Principles and practice (2nd ed.). John Wiley & Sons.
20. Joffe. J., 1965: A.B.C. of Soil, Oxford Book Company, Calcutta
21. Kale, V.S. and Gupta, A. 2001. Introduction to Geomorphology, Orient Longman Ltd., Kolkata
22. Keller, E. A., & Pinter, N. (2002). Active tectonics: Earthquakes, uplift, and landscape (2nd ed.). Prentice Hall.
23. Knighton, D. 1998: Fluvial Forms and Processes: A New Perspective, Arnold, London
24. King, L.C., 1965 Morphology of the Earth, Oliver and Boyd, Edinburgh.
25. Kumar, R., Singh, V. P., & Parvaze, S. (2026). Watershed planning and management. CRC Press.
26. Lal, R. (Ed.). (2017). Soil health and intensification of agroecosystems. Academic Press.
27. Lutgens, F.K., and Tarbuck, E.J. 1998: The Atmosphere: An Introduction to Meteorology, 7th edition, Prentice-Hall Inc.
28. Maiti, R. 2023: Geotectonics and Geomorphology: An insight into Process-Form Relationship, Nabodaya Publications, Kolkata
29. Marinelli, F. (2024). *Darcy's law in variable density groundwater systems*. The Groundwater Project.
30. Matczak, P., & Hegger, D. L. T. (Eds.). (2020). Flood risk governance for more resilience. MDPI Books.
31. National Research Council. (2010). Advancing the science of climate change. National Academies Press.
32. Pant, G.B. and Kumar, R.K. 1997: Climates of South Asia, John Wiley and Sons Ltd., Chichester
33. Roni, P., & Beechie, T. (Eds.). (2013). Stream and watershed restoration: A guide to restoring riverine processes and habitats. John Wiley & Sons
34. Sabel, C. F., & Victor, D. G. (2022). Fixing the climate: Strategies for an uncertain world. Princeton University Press.

35. Subramanya, K. (2013). Engineering Hydrology, McGraw Hill Education (India) Private Limited
36. Todd, D. K., & Mays, L. W. (2005). Groundwater hydrology (3rd ed.). John Wiley & Sons.
37. Younos, T., Parece, T. E., & Lee, J. (Eds.). (2026). Sustainable rainwater harvesting systems: A paradigm shift in rainwater and stormwater use. Springer Nature Switzerland.
38. Zăvoianu, I. (2011). Morphometry of drainage basins (Vol. 20). Elsevier Science.

COURSE3 (CODE: GEOG7013)

COURSE TITLE: ADVANCED HUMAN GEOGRAPHY

Credits:6
Lecture hours: 90 Total Marks:75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to make the students ready on the recent trends in human geography and their applications. This is significant as the students may be aware about the advanced human geographical concepts before undertaking nay kind of research.

Learning Outcome:
After learning the course, the student is expected to have a clear understanding of the recent advances in human geography which include settlement geography, population geography, resource and economic geography

Professional Skill Development:
The student is expected to develop their skills and expertise in analysing the factors governing the location of settlements, population patterns and determinants, management of resources and economy in a geographical setting.

UNIT I: Advanced Population Geography Lecture Hours: 25

1. Population Dynamics: Environmental Kuznets Curve and Demographic Dividend
2. National Population Policy of India
3. Population-Resource Relationships: Carrying Capacity and Ecological Footprint

UNIT II: Advanced Urban Geography Lecture Hours: 25

4. Urban Systems- The Law of the Primate City and Rank-Size Rule; Urban Ecology
5. Urbanization Processes: Metropolitanization, Suburbanization, Peri-urbanization, and Counterurbanization, Urbanization in Developed and Developing Countries
6. Urban Development and Management-Master Plan, City Development Plan, Smart City, Green City, Urban Liveability, Sustainable City

UNIT III: Advanced Resource Geography Lecture Hours: 20

1. Scope and relevance of Resource Geography, Economic and Environmental approaches of Resource utilization, Limits to Growth and Tragedy of the Commons
2. Common Pool Resources- Challenges, Management and Future; Resource Curse Theory, Dutch disease-Symptoms and Management
3. Conservation and management of Land, Water &Energy resources; Theories of human Resource management, Issues and Challenges of Human Resource management in Developed and Developing Countries

UNIT IV: Advanced Economic Geography Lecture Hours: 20

1. Concept of Distance, Accessibility and Connectivity; Comparative Cost Analysis, Trade Corridors and Barriers
2. Neo-liberal Economy: Issues and Challenges in India, SEZ in India
3. Regional Trade Blocks, World Trade Organisation (WTO), Intellectual Property Rights (IPR)

SUGGESTED READINGS:

1. Alberti, M. (2008). Advances in urban ecology: Integrating evolutionary and ecological processes at the urban fringe. Springer.
2. Auty, R. M. (1993). Sustainable development in mineral economies: The resource curse thesis. Routledge.
3. Batty, M. (2013). The new science of cities. MIT Press.
4. Bloom, D. E., Canning, D., & Sevilla, J. (2003). The demographic dividend: A new perspective on the economic consequences of population change. RAND Corporation.
5. Bird, J., 1977: Centrality and Cities, Routledge, London
6. Brenner, N. (2019). New urban spaces: Urban theory and the scale question. Oxford University Press.
7. Carter, H. 1981: Urban Geography, 3rd edition Arnold-Heinemann, New Delhi
8. Datt, R. & K.P.M. Sundaram (2006) Indian Economy, Prentice - Hall Inc
9. Dickinson, R.E. 1968: City and Region: A Geographical Interpretation, Routledge and Kegam Paul Ltd. London.
10. Diddee, J., 1997: Indian Medium Towns, Rawat Publications, Jaipur.
11. Douglas, I., & James, P. (2015). Urban ecology: An introduction. Routledge.
12. Elliotte, J. A. 1994: An Introduction to Sustainable Development: The Developing World, Routledge, London.
13. Forman, R. T. T. (2014). Urban ecology: Science of cities. Cambridge University Press.
14. Flint C and Flint.D, 1999: Urbanisation Changing Environments, Collins, London
15. Gehl, J. (2010). Cities for people. Island Press.
16. Hassan, M. Izhar, 2005, Population Geography, Rawat Publications
17. Herbert, David and Thomas, Colin, 1982: Urban Geography A First Approach, John Wiley & Sons, New Delhi
18. Herbert, D.T., Johnston,R.J.,1982, Geography and the Urban Environment, John Wiley& Sons
19. Johnston R.J (2000): The Dictionary of Human Geography, Blackwell. UK
20. Johnston, R.J., Taylor, P.J. and Watts, M.J. (editors): 1995: Geographies of Global Change: Remapping the World in the Late Twentieth Century, Blackwell, Oxford.
21. Kaplan. D and Wheeler.J (2008): Urban Geography, John Wiley
22. Kuznets, S. (1965). Economic growth and structure: Selected essays. W. W. Norton & Company.
23. Mitchell, B. 1997: Resources and Environment Management, Addison Wesley Lon~an Ltd., Harlow.
24. Portugali, J. (Ed.). (2021). Handbook on cities and complexity. Edward Elgar Publishing.
25. Rao, R. Rammohan and S. Simhadri 1999: Indian Cities: Towards Next Millenium, Rawat Publications, Jaipur.
26. Sharma, R.N. and K. Sita 2001: Issues in Urban Development, Rawat Publications, Jaipur.
27. van den Bergh, J. C. J. M. (Ed.). (1999). Handbook of environmental and resource economics. Edward Elgar Publishing.
28. White, R., Engelen, G., & Uljee, I. (2015). Modeling cities and regions as complex systems: From theory to planning applications. MIT Press

COURSE 4 (CODE: GEOG7014)

COURSE TITLE: REMOTE SENSING AND GIS APPLICATIONS
Credits: 6
Practical (Lecture Hours: 180 Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to equip the students advanced functionalities, skills and tools of remote sensing and GIS enabling them to acquire, analyse and interpret spatial data for solving real-world problems.

Learning Outcome:
After learning the course, the student is expected to design and execute an independent GIS/RS project from data acquisition and pre-processing to spatial analysis and final map production.

Professional Skill Development:
The skills developed and acquired in this course directly translate to high-demand industry workflows in the diverse domains of environmental management, urban planning, agriculture, forestry, disaster response and resource management

PRACTICAL HOURS: 60
DEMONSTRATION HOURS (IN LABORATORY): 120

UNIT I: Data Acquisition and Digital Image Processing (DIP) Lecture Hours: 30

1. Downloading of Satellite Data from different platforms: SRTM, CARTOSAT, IRS LISS IV, LANDSAT 9, SENTINEL 2 datasets
2. Image Enhancement techniques: Contrast Enhancement, Edge Enhancement, Spatial Filtering
3. Digital Image Processing: Geometric and Radiometric Corrections

UNIT II: Image Classification and Spectral Analysis Lecture Hours: 30

4. Image Classification: Supervised and Unsupervised using software, Accuracy Assessment: Understanding of Error Matrix and Kappa Coefficient
5. LULC Change detection and reclassification
6. Band Ratioing and Spectral Indices: NDVI, MNDWI, NDBI using software

UNIT III: Spatial Analysis and Terrain Mapping Lecture Hours: 30

1. Spatial Interpolation Techniques: IDW, Kriging and Natural Neighbour by software
2. Working with Digital Elevation Models (DEMs): DEM Processing: Fill, Sink, Flow Direction, Flow Accumulation and Extraction of Drainage Network
3. Morphometric Analysis from DEMs: Physiographic Divisions, Relative Relief, Slope, Dissection Index, Hypsometric Curve, Drainage Density, Stream Frequency and Ruggedness Number

UNIT IV: GIS Mapping and Vector Analysis **Lecture Hours: 30**

1. Vector data modelling: Mapping of point, line, polygon, through software
2. Vector Overlay Analysis: Types of Overlay (point-in-polygon; line-in-polygon, polygon-on-polygon)
3. Map Composition and Output Generation: Map Layout, Annotation and Preparation of properly labelled thematic maps in GIS

SUGGESTED READINGS:

1. Bhatta, B. (2021). Remote Sensing and GIS (3rd Edition). OUP India.
2. Burger, W., & Burge, M. J. (2016). Digital image processing: An algorithmic introduction (2nd ed.). Springer.
3. Campbell, J .B. 1996: Introduction to Remote Sensing, 2nd edition, Taylor & Francis, London
4. Chaisman, N. 1992: Exploring Geographical Information Systems, John Wiley and Sons Inc., New York.
5. Chang, K. (2016). Introduction to geographic information systems (8th ed.). McGraw-Hill Education.
6. de Carvalho Alves, M., & Sanches, L. (2023). Remote sensing and digital image processing with R. CRC Press.
7. Gonzalez, R. C., & Woods, R. E. (2018). Digital image processing (4th ed.). Pearson.
8. Heywood, D. I., Cornelius, S. C., & Carver, S. J. (2011). An Introduction to Geographical Information Systems (4th ed.). Pearson Prentice Hall.
9. Jensen, J. R. (2016). Introductory digital image processing: A remote sensing perspective (4th ed.). Pearson.
10. Joseph, G. and Jeganathan, C. (2018): Fundamentals of Remote Sensing (3rd Edition), Orient Blackswann, New Delhi
11. Li, J., Du, Q., Chanussot, J., Li, W., Xi, B., Song, R., & Li, Y. (Eds.). (2024). Remote sensing image classification and semantic segmentation. MDPI Books.
12. Lillesand, T.M. and Kiefer, R. W. 1994: Remote Sensing and Image Interpretation, 3rd edition, John Wiley and Sons, New York.
13. Marcolongo, B. And Mantorani, F. 1997: Photogeology: Remote Sensing Application in Earth Science, Oxford and IBH Pub. Pvt. Ltd., New Delhi
14. Rajan, M.S. 1995: Space Today, 2nd edition, National Book Trust, New Delhi.
15. Rao, U.R. 1996: Space Technology for Sustainable Development, Tata McGraw-Hill, New Delhi
16. Richards, J. A. (2022). Remote sensing digital image analysis (6th ed.). Springer Nature.
17. Sabins, F.F., 1997: Remote Sensing: Principles and Applications, 3rd edition, W.H. Freeman & Company, New York.
18. Tomaszewski, B. (2020). Geographic Information Systems (GIS) for Disaster Management (2nd ed.). Routledge.

MINOR COURSE (CODE: GEOG7021)

ENVIRONMENTAL ISSUES IN GEOGRAPHY & CLIMATE CHANGE
Credit: 4

Lecture hours:60 Total Marks:75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to make the students aware the burning issues of environmental conservation and climate change.

Learning Outcome:
After learning the course, the student is expected to apprehend the possible effects as well as the contribution factors of climate change.

Professional Skill Development:
The skills developed and acquired in this course may help the students to be associated with various government and non-government institutes, actively participating in policy making in the domain of environment and climate change.

Unit-I **Lecture Hours: 30**

1. Environmental Geography: Concepts, Scope and Content
2. Principles of Ecology: Plant, Animal & Human
3. Environmental Pollution and Degradation: Air, Water Land, Forest and Biosphere
4. Biological Hazards: Issues and Concerns, Endemic and Pandemic

Unit-II **Lecture Hours: 30**

5. Climate Change: Concept, Causes and Spatio-temporal implications
6. Climate Change Perspectives: Mechanisms, Global Warming, Greenhouse Gases, Sea level Rise
7. Vulnerability to Climate Change: Physical, Economic, Social Vulnerability
8. Climate Change Towards Sustainability: Carbon Footprint, Carbon Trading, Climate Justice, Climate Finance, Net Zero Emissions

SUGGESTED READINGS:

1. Dessler, A. E. (2021). Introduction to Modern Climate Change (3rd ed.). Cambridge University Press.
2. Gadgil, M., & Guha, R. (1995). Ecology and equity: The use and abuse of nature in contemporary India. Routledge.
3. Ghosh, A. (2016). The Great Derangement: Climate Change and the Unthinkable. Penguin Books India.
4. Lave, R., Biermann, C., & Lane, S. N. (Eds.). (2018). The Palgrave Handbook of Critical Environmental Geography. Palgrave Macmillan.
5. Marsh, W. M., & Grossa, J., Jr. (2004). Environmental Geography: People and the Environment (3rd ed.). John Wiley & Sons.
6. Maslin, M. (2021). Climate Change: A Very Short Introduction (4th ed.). Oxford University Press.
7. Romm, J. (2022). Climate Change: What Everyone Needs to Know (3rd ed.). Oxford University Press.
8. Shrivastav, S. (2022). Environmental geography. Current Publication.
9. Srivastava, D. K., & Ramamurthy, V. S. (2021). Climate Change and Energy Options for a Sustainable Future. World Scientific Publishing.
10. Singh, S. (2021). Environmental geography (Revised ed.). Prayag Pustak Bhawan.

SEMESTER VIII
COURSE1 (CODE: GEOG8011)
COURSE TITLE: RESEARCH METHODLOGY IN GEOGRAPHY

Credits: 6

Lecture hours: 90 Total Marks:75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to make the student understand the nature, characteristics and types of research so that the student finds it easier while venturing into the domain of research.

Learning Outcome:
After learning the course, the student is expected to design a robust research project, master the approaches of quantitative and qualitative methods, formulate spatial research questions and communicate scientific findings,

Professional Skill Development:
The skills developed and acquired in this course may help the students to be associated with various research institutes as a research fellow/scientist. For pursing Ph.D, this course can be a background.

UNIT I: Geographical Context in Research **Lecture Hours: 30**

1. Generic Concepts and Principles in Geography, Organization of Knowledge in Geography
2. Concepts and Significance of Research in Geography: Objectives and Types of Research
3. Approaches to Research in Geography: Philosophy – Empiricist, Positivist and Post-Positivist, Methods: Inductive-Deductive; Analytical-Descriptive

Unit-II: Data Collection and Analysis **Lecture Hours: 30**

4. Research Design: Need and types of research designs
5. Qualitative Techniques: Observation, questionnaires, interview, focus group discussions, narratives and statement analysis
6. Management of qualitative and quantitative data: Collection, Reliability, Authenticity; Treatment of Data Anomaly, Processing of Data, Formulation of Research Questions and Hypothesis, Type I and Type II Errors

Unit-III: Report Making and Presentation **Lecture Hours: 15**

7. Components of Research writing: Literature Review, Abstract, Synopsis,
8. Preparation of research reports/papers; Citations and referencing styles (APA/MLA)
9. Writing, Tabulation, Presentation and Communication of Research Outputs

UNIT IV: Publication and Research Ethics **Lecture Hours: 15**

10. Research ethics and academic integrity with special reference to Plagiarism, UGC COPE Guidelines
11. Predatory Journals and Issues in Academic Publication
12. Professional Conduct in Research: Recognition of local guides, translators, respondents, and coauthors, publication-related responsibilities

SUGGESTED READINGS:

1. Ahuja, R. (2001). Research Methodology. Rawat Publication.
2. Das, D. L. (2000). Practice of Social Research. Rawat Publication.
3. David, F. E. (2000). Scientific Method for Ecological Research. Cambridge.
4. Gibaldi, J., & Achtert, W. S. (1989). MLA handbook for writers of research papers. Affiliated East West Press Private Limited.
5. Harper, C., & Marcus, R. (2007). Research for Development: A practical Guide. Vistaar Publication.
6. Kothari, C. (2009). Research Methodology: Methods and Techniques. New Age International Publishers.
7. Misra, H., & Singh, V. (1998). Research Methodology in Geography: Social and Policy Dimension. Rawat Publication.
8. Misra, R. (2001). Research Methodology: A handbook. New Delhi: Concept Publishing Company.
9. Mondal, R. Research Methodology for Social Scientist. Concept Publication.
10. Mukherjee, N. (1997). Participatory Rural Appraisal and Questionnaire Survey. Concept Publishing Company.
11. Panneerselvam, R. (2009). Research Methodology. Learning private limited.
12. Paul, C. (2001). An Introduction to Regional Geography. Blackwell Publishers.
13. Pramanick, S. K., & Datta, P. (1994). Panchayas and People: The West Bengal Experience. Sarat Book House.
14. Raza, M. (1979). Survey of Research in Geography. Allied Publishers Private Limited.
15. Reddy, G. A. (1995). Planning and Regional Development towards identification of Economic Potential, Rajesh Publication.
16. Singh, K. (2007). Quantitative Social Research Methods. Sage Publication.
17. Somekh, B., & Lewin, C. (2005). Research Methods in the Social Science. Vistaar Publication.
18. Walter, Issard (1975): Introduction to Regional Science, Prentice-Hall, NewYork.

MINOR COURSE (CODE: GEOG8021)

GEOINFORMATICS AND SPATIAL INFORMATION TECHNOLOGY
Credit: 4

Lecture hours:60 Total Marks:75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to make the student understand the foundational aspects of remote sensing and GIS for being ready for further explorations in this field.

Learning Outcome:
After learning the course, the student is expected to have a theoretical understanding of the discipline of geoinformatics and spatial science.

Professional Skill Development:
The skills developed and acquired in this course may help the students for pursuing further studies in geoinformatics, satellite remote sensing and spatial information technology.

Unit-I **Lecture Hours: 30**

1. Concept & Types of Remote Sensing, EMR
2. Advantages of Remote Sensing and GIS over Conventional Surveying Techniques
3. Bands: Visible, Infra-red (NIR & SWIR), Sensor, Resolution, FCC: Case studies of IRS and LANDSAT
4. Procurement and downloading of open-source GIS data and softwares, Applications in earth and environmental sciences

Unit-II **Lecture Hours: 30**

5. Spatial Information: Concepts, Definitions and Sources
6. Role of Spatial Information in Decision making
7. Sources of Error in Spatial Data
8. Spatial Data Platforms: USGS, BHUVAN, BHOONIDHI

SUGGESTED READINGS:

1. Bhatta, B. (2021). Remote Sensing and GIS (3rd Edition). OUP India.
2. Burger, W., & Burge, M. J. (2016). Digital image processing: An algorithmic introduction (2nd ed.). Springer.
3. Campbell, J .B. 1996: Introduction to Remote Sensing, 2nd edition, Taylor & Francis, London
4. Chaisman, N. 1992: Exploring Geographical Information Systems, John Wiley and Sons Inc., New York.
5. Chang, K. (2016). Introduction to geographic information systems (8th ed.). McGraw-Hill Education.
6. de Carvalho Alves, M., & Sanches, L. (2023). Remote sensing and digital image processing with R. CRC Press.
7. Gonzalez, R. C., & Woods, R. E. (2018). Digital image processing (4th ed.). Pearson.
8. Heywood, D. I., Cornelius, S. C., & Carver, S. J. (2011). An Introduction to Geographical Information Systems (4th ed.). Pearson Prentice Hall.
9. Jensen, J. R. (2016). Introductory digital image processing: A remote sensing perspective (4th ed.). Pearson.
10. Joseph, G. and Jeganathan, C. (2018): Fundamentals of Remote Sensing (3rd Edition), Orient Blackswann, New Delhi
11. Li, J., Du, Q., Chanussot, J., Li, W., Xi, B., Song, R., & Li, Y. (Eds.). (2024). Remote sensing image classification and semantic segmentation. MDPI Books.
12. Lillesand, T.M. and Kiefer, R. W. 1994: Remote Sensing and Image Interpretation, 3rd edition, John Wiley and Sons, New York.
13. Marcolongo, B. And Mantorani, F. 1997: Photogeology: Remote Sensing Application in Earth Science, Oxford and IBH Pub. Pvt. Ltd., New Delhi
14. Rajan, M.S. 1995: Space Today, 2nd edition, National Book Trust, New Delhi.
15. Rao, U.R. 1996: Space Technology for Sustainable Development, Tata McGraw-Hill, New Delhi
16. Richards, J. A. (2022). Remote sensing digital image analysis (6th ed.). Springer Nature.
17. Sabins, F.F., 1997: Remote Sensing: Principles and Applications, 3rd edition, W.H. Freeman & Company, New York.
18. Tomaszewski, B. (2020). Geographic Information Systems (GIS) for Disaster Management (2nd ed.). Routledge.

DISSERTATION (CODE: GEOG8091)

Credit: 12

Total Marks:225 Course Evaluation: Seminar Presentation, Preparation & Submission of Research Project/Dissertation-135 + Viva-90

The Dissertation will be a comprehensive work based on conceptual aspects, fieldwork analysis of primary and secondary data. It should mention the objectives, sources of information, methods and approaches. Interrelations between different aspects of the study should be the focus of the work.

Text of the work should not exceed 10,000 words and should ideally be divided into the following
sections:
• Introduction, • Literature Review, • Statement of the Problem(s) and Objectives • Results and Discussions • Conclusions • References and • Appendices (if any).
Maps, diagrams and sketches, excluding photographs, should not exceed 30 pages of A4 size paper.
Each of the study work is to be produced individually by the students and this must be stated clearly in a certificate from the supervisor(s). Photocopying and/or bulk computer typing are not to be allowed in any form.
Each student must furnish a self-declaration of the Dissertation being checked for plagiarism as per recent UGC guidelines.

OR

SEMESTER VIII
COURSE1(CODE: GEOG8011)
COURSE TITLE: RESEARCH METHODLOGY IN GEOGRAPHY

Credits: 6

Lecture hours: 90 Total Marks:75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to make the student understand the nature, characteristics and types of research so that the student finds it easier while venturing into the domain of research.

Learning Outcome:
After learning the course, the student is expected to design a robust research project, master the approaches of quantitative and qualitative methods, formulate spatial research questions and communicate scientific findings,

Professional Skill Development:
The skills developed and acquired in this course may help the students to be associated with various research institutes as a research fellow/scientist. For pursing Ph.D, this course can be a background.

UNIT I: Geographical Context in Research **Lecture Hours: 30**

1. Generic Concepts and Principles in Geography, Organization of Knowledge in Geography
2. Concepts and Significance of Research in Geography: Objectives and Types of Research
3. Approaches to Research in Geography: Philosophy – Empiricist, Positivist and Post-Positivist, Methods: Inductive-Deductive; Analytical-Descriptive

Unit-II: Data Collection and Analysis **Lecture Hours: 30**

4. Research Design: Need and types of research designs
5. Field Techniques and Tools: Observation (participant, non-participant), questionnaires (open, closed, structured, semi-structured), interview, focus group discussions, narratives and statement analysis
6. Management of qualitative and quantitative data: Collection, Reliability, Authenticity; Treatment of Data Anomaly, Processing of Data, Basic Statistical Testing (t-test, ANOVA, Chi Square using FOSS)

Unit-III: Report Making and Presentation **Lecture Hours: 15**

7. Components of Research writing: Abstract, Synopsis, Literature Review and Book Review
8. Preparation of research reports/papers and referencing styles (APA/MLA)
9. Writing, Presentation and Communication of Research Outputs

UNIT IV: Publication and Research Ethics **Lecture Hours: 15**

10. Research ethics and academic integrity with special reference to Plagiarism
11. Predatory Journals and Issues in Academic Publication
12. Professional Conduct in Research: Recognition of local guides, translators, respondents, and coauthors, publication-related responsibilities

SUGGESTED READINGS:

1. Ahuja, R. (2001). Research Methodology. Rawat Publication.
2. Das, D. L. (2000). Practice of Social Research. Rawat Publication.
3. David, F. E. (2000). Scientific Method for Ecological Research. Cambridge.
4. Gibaldi, J., & Achtert, W. S. (1989). MLA handbook for writers of research papers. Affiliated East West Press Private Limited.
5. Harper, C., & Marcus, R. (2007). Research for Development: A practical Guide. Vistaar Publication.
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7. Misra, H., & Singh, V. (1998). Research Methodology in Geography: Social and Policy Dimension. Rawat Publication.
8. Misra, R. (2001). Research Methodology: A handbook. New Delhi: Concept Publishing Company.
9. Mondal, R. Research Methodology for Social Scientist. Concept Publication.
10. Mukherjee, N. (1997). Participatory Rural Appraisal and Questionnaire Survey. Concept Publishing Company.
11. Panneerselvam, R. (2009). Research Methodology. Learning private limited.
12. Paul, C. (2001). An Introduction to Regional Geography. Blackwell Publishers.
13. Pramanick, S. K., & Datta, P. (1994). Panchayas and People: The West Bengal Experience. Sarat Book House.
14. Raza, M. (1979). Survey of Research in Geography. Allied Publishers Private Limited.
15. Reddy, G. A. (1995). Planning and Regional Development towards identification of Economic Potential, Rajesh Publication.
16. Singh, K. (2007). Quantitative Social Research Methods. Sage Publication.
17. Somekh, B., & Lewin, C. (2005). Research Methods in the Social Science. Vistaar Publication.
18. Walter, Issard (1975): Introduction to Regional Science, Prentice-Hall, NewYork.

COURSE2(CODE: GEOG8012)

COURSE TITLE: CONTEMPORARY ISSUES IN PHYSICAL GEOGRAPHY
Credits:4
Lecture hours: 60 Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to ensure that the students are aware about the contemporary issues in geographical arena which include environmental management, climate change, disaster management and sustainable development.

Learning Outcome:
After learning the course, the student is expected to find a plethora of issues on which the future research and internship can be undertaken.

Professional Skill Development:
The skills developed and acquired in this course may help the students to make their way into various government and non-governmental organizations focused on research and policy framing.

UNIT I: Contemporary Environmental Issues **Lecture Hours: 15**

1. Defining the current geological epoch shaped by human activity (The Anthropocene), Extreme Weather Events
2. Depletion of Resources: Land Degradation, Groundwater Scarcity, Deglaciation and its impact on local and regional patterns, Ocean acidification and Coral Reef Bleaching, Deforestation and Habitat Fragmentation
3. Environmental Justice and Mitigation Measures: The Role of IPCC, Kyoto Protocol, Paris Agreement and Conference of Parties.

UNIT II: Climate Change Impacts **Lecture Hours: 15**

1. Understanding Climate Change: Geological Time and Reconstructing Past Climates, Anthropogenetic drivers and Greenhouse Emissions, LULC Changes and Urban Heat Islands
2. Sea Level Change: Types and Causes, Impact of Sea Level Change on Coasts and Estuaries, Integrated Coastal Zone Management with special reference to Coastal Regulation Zones (CRZs) and Coastal Management Zones (CMZs)
3. Climate Change Mitigation Framework: Carbon Footprint, Carbon Sequestration, Climate-Smart Agriculture

UNIT III: Disaster Management **Lecture Hours: 15**

1. Concepts of Hazards & Disasters, Major Disasters and their occurrences: Earthquake, Tsunami, Floods, Cyclones, Landslides
2. Understanding of Risk, Vulnerability and Resilience and their assessment, Sendai Framework for DRR, United Nations Platform for Space-based Information for Disaster Management & Emergency Response, SDG-11 Target 5 (Reducing the adverse effects of natural disasters)
3. DRR in Indian Context: Institutional Framework (NDMA, NIDM, NDRF), Support systems and monitoring agencies (ISRO, Bhuvan Portal), Disaster Management Act of India

UNIT IV: Sustainable Development **Lecture Hours: 15**

1. Venn Diagram of Economic Viability, Social Equity & Environmental Protection
2. Self-Reliant India (Atmanirbhar Bharat): Make in India, Startups
3. Viksit Bharat @2047: Major Pathways, Issues and Challenges

SUGGESTED READINGS:

1. Allaby. M. 2006. The Encyclopedia of Natural Calamities: Flood., Viva Books Private Limited, New Delhi.
2. Barman, N., Deka, B., & Morang, P. (Eds.). (2025). Viksit Bharat @ 2047: Emerging momentum. Red'Shine Publication.
3. Bonneuil, C., & Fressoz, J.-B. (2016). The shock of the Anthropocene: The Earth, history and us (D. Fernbach, Trans.). Verso.
4. Coolsaet, B. (Ed.). (2020). Environmental Justice: Key Issues (1st ed.). Routledge.
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6. Deshmukh, A. B. (2017). Fundamentals of Disaster Management. Astral International Pvt. Limited.
7. Dessler, A. E. (2021). Introduction to Modern Climate Change (3rd ed.). Cambridge University Press.
8. Elliott, J. A. (2013). An Introduction to Sustainable Development (3rd ed.). Routledge.
9. Gadgil, M., & Guha, R. (1995). Ecology and equity: The use and abuse of nature in contemporary India. Routledge.
10. Ghosh, A. (2021). The nutmeg's curse: Parables for a planet in crisis. University of Chicago Press.
11. Gurumurthy, S., & Gupta, A. (Eds.). (2021). Aatmanirbhar Bharat: A vibrant and strong India. Aryan Books International.
12. Hardenberg, W. G. von. (2024). Sea level: A history. The University of Chicago Press.
13. Houghton, J. T. (1997). Global Warming: The Complete Briefing. Cambridge University Press.
14. Klare, M. T. (2012). The race for what's left: The global scramble for the world's last resources. Metropolitan Books.
15. Jaiswal, K. S., Mishra, A. K., Shukla, S. K., & Kumar, K. (2022). Aatmanirbhar Bharat Abhiyan: A roadmap to socio-economic growth. New Delhi Publishers.
16. Maslin, M. (2021). Climate Change: A Very Short Introduction (4th ed.). Oxford University Press.
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19. Pandey, M. (2023). Disaster Management (2nd ed.). Wiley India.
20. Pinkowski, J. (Ed.). (2008). Disaster Management: International Lessons in Risk Reduction, Response and Recovery. CRC Press.
21. Pirazzoli, P.A. 1996. Sea Level Changes: The Last 20,000 Years, Routledge, London.
22. Pittie, A. (2025). Viksit Bharat India @ 2047. Fingerprint Publishing.
23. Pugh, D. (2004). Changing sea levels: Effects of tides, weather and climate. Cambridge University Press.
24. Ritchie, H. (2024). Not the End of the World: How We Can Be the First Generation to Build a Sustainable Planet. Little, Brown Spark.
25. Romm, J. (2022). Climate Change: What Everyone Needs to Know (3rd ed.). Oxford University Press.
26. Roorda, N. (2025). Fundamentals of Sustainable Development (4th ed.). Routledge.
27. Sharma, V. K. (2010). Natural disaster management in India: New initiatives. Indian Institute of Public Administration.
28. Vashisht, S. (2021). Atmanirbhar Bharat. Prabhat Prakashan.
29. Walker, G. (2012). Environmental Justice: Concepts, Evidence and Politics. Routledge
30. Zalasiewicz, J., Waters, C. N., Williams, M., & Summerhayes, C. (Eds.). (2019). The Anthropocene as a geological time unit: A guide to the scientific evidence and current debate. Cambridge University Press.

COURSE 2 (CODE: GEOG8013)

COURSE TITLE: CONTEMPORARY HUMAN GEOGRAPHY
Credits: 4
Lecture hours: 60 Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to ensure that the students are aware about the contemporary issues in the human geographical arena which include development, social geography, cultural geography and geopolitics

Learning Outcome:
After learning the course, the student is expected to find a plethora of issues on contemporary human geography on which the future research and internship can be undertaken.

Professional Skill Development:
The skills developed and acquired in this course may help the students to make their way into various government and non-governmental organizations focused on research and policy framing.

UNITI: Contemporary Developmental Issues **Lecture Hours: 15**

1. Contemporary Problems on Rural development: Rural-Urban Migration; Land Use Changes; Land Acquisition and Transactions; Rural-urban Linkages with Special References to India, Rural Development and Planning (MGNREGA, PMGSY)
2. Urban Development Trends in Independent India; Urban Planning in India with special reference to Master plan; Urban Policies in India (JNNURM, Smart City and AMRUT)
3. Digital India and Digital Transformation: Digital Infrastructure and Regional Disparity, E-Governance and Digital Public Services, Digital Economy

UNIT II: Social Geography **Lecture Hours: 15**

4. Theories of Social Formation and Transformation-Functional Theory (T. Parsons), Conflict Theory (K. Marx), Indian Social Theories: *Ekatna Manab Darshan* (Deen Dayal Upadhyay)
5. Climate Change and Vulnerable Communities, Resource Access and Social Conflicts
6. Urbanization and Segregation, Gentrification, Social Polarization, Informal Settlements and Urban Poverty

UNIT III: Cultural Geography **Lecture Hours: 15**

1. Development of Cultural Geography, Role of Technology in the Evolution of Culture, Cultural Take off, Socio-cultural Transformation
2. Indigenous Cultural Systems – Traditional Ecological Knowledge, Cultural Resource Management and Community Participation in Heritage Conservation, Folk Culture
3. Cultural Globalization and Cultural Segregation, Diaspora and Ethnic Identity: Significance of Class and Caste

UNIT IV: Political Geography **Lecture Hours: 15**

1. Concept of Geopolitics, Geography of Federalism; Concept of State, Nation, Nation State, Frontiers and Boundaries
2. Geopolitical Theories - Heartland and Rimland, Geopolitics of Indian Ocean; Neopolitics of World Natural Resources with special reference to Energy Resources
3. Economic and Strategic Alliances-QUAD and BRICS; Strategic Significance of the Straits of Hormuz and Malacca.

SUGGESTED READINGS:

1. Acemoglu, D., & Robinson, J. A. (2012). Why nations fail: The origins of power, prosperity, and poverty. Crown Business.
2. Adhikari, Sudeepta (2002) Political Geography, Rawat Publications, New Delhi
3. Ahmad, Aijazuddin., 1999, Social Geography, Rawat Publication, New Delhi.
4. Ahuja, Ram, 1999, Society in India, Rawat Publication, Delhi
5. Banerjee, A. V., & Duflo, E. (2011). Poor economics: A radical rethinking of the way to fight global poverty. PublicAffairs.
6. Boudeville, J. R. (1966): Problems of Regional Economic Planning, Edinburgh University Press, Edinburgh.
7. Chand.M, Puri.V.K, (1983): Regional Planning in India, Allied Publishers, New Delhi.
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9. Cox, Kevin R. (2002) Political Geography: Territory, State, and Society, Blackwell Publishers, Oxford
10. Das, A. K. (2007). Urban Planning in India. New Delhi: Rawat Publication.
11. De Blij, H.J. and Muller, P.O. 1997: Geography: Realms Regions and Concepts, 8th edition, John Wiley and Sons Ltd., New York.
12. Dickinson. R.E, (1964): City and Region: A geographical interpretation, Routledge and Kegan Paul Ltd., London.
13. Dickinson.R.E, (1964): City, Region and Regionalism, A geographical Contribution to Human ecology Kegan Paul Ltd., London.
14. Dreze.J and Sen A. (1996): Economic Development and Social Oppurtinity, Oxford University Press, New Delhi.
15. Dutta,R. & K.P.M, Sundaram,(1997): Indian Economy, S. Chand and Cc. Ltd, New Delhi.
16. Gregory, D., Urry, J.,1985. Social Relation & Spatial Structure, MacMillan
17. GSE Publications. (2025). One India through Digital India. GSE Publications. https://gsepublications.in/book/one-india-through-digital-india
18. Hussain Majid. Cultural Geography, Anmol Publications PVT. Ltd.
19. Hussain Majid, Human Geography, Rawat Publications, New Delhi
20. Knox, P., Pinch, S., 2000, Urban Social Geography, Pearson Education.
21. Meier,G., Rauch,J., 2003, Leading Issues in Economic Development, Oxford University Press
22. Mitchell, D., 2000, Cultural Geography- A Critical Introduction, Black Well
23. Oakes, Timothy. S., and Price, Patricia L., 2008, The Cultural Geography Reader, Routledge Publication, New York.
24. Peet, R. and Hartwick, E., 1999, Theories of Development, Rawat Publications
25. Pounds, Norman J.G. (1963) Political Geography, Mc Graw Hill Book Company
26. Rao, M. S. A., 2000, Social Movements in India
27. Ramaswamy, B. (2016). Handbook of Digital India: Initiative and programme. Indian Books and Periodicals.
28. Singh, Kartar 1986: Rural Development: Principles, Policies and Management, Sage Publication New Delhi

COURSE4 (CODE: GEOG8014)

COURSE TITLE: QUANTITATIVE TECHNIQUES IN GEOGRAPHY & THEMATIC MAPPING

Credits: 4

Lecture hours: 60 Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:

The primary objective of the course is to ensure that the students are efficient in the process of handling and analysing data based on various physical and human parameters.

Learning Outcome:

After learning the course, the student is expected to systematically analyse various kinds of data during a research project. Also, they are expected to understand the suitable statistical techniques which need to be adopted for various kinds of data.

Professional Skill Development:

The skills developed and acquired in this course may help the students to have a foundational understanding of data science and data analytics which may help them in future endeavour towards research and/or data science industry.

UNIT I: Basic Mathematics and Data Distribution Lecture Hours: 15

1. Concept of Probability and its Mathematical Formulation: Bayes Theorem and Related Equations, Permutation and Combination, Confidence Intervals
2. Probability Distributions: Normal, Binomial and Poisson Distributions, Tests for Normality: Q-Q Plot, Kolmogorov-Smirnov Test, and Anderson-Darling Test
3. Matrix Algebra: Matrices types, Addition, Subtraction, Multiplication, Transpose Matrix, Cramer's Rule

UNIT II: Statistical Interrelationships and Time Series Analysis Lecture Hours: 15

4. Interpolation and Extrapolation Techniques (Lagrange, Gaussian)
5. Advanced Correlation and Regression Analysis: (Exponential, Power, Polynomial, Point Biserial, Partial, Multiple)
6. Time Series Analysis and Trend Detection: Moving Average, Semi-Average, Seasonal Index, Mann Kendall's Test, Sen's Slope, Pettitt's Test, Durbin-Watson Test for Autocorrelation

UNIT III: Hypothesis Testing and Inferential Statistics Lecture Hours: 15

7. Parametric Tests for Mean Differences: t-test, ANOVA, ANCOVA, Cohen's Test for Effect Size
8. Non-Parametric Tests: Mann-Whitney U Test, Brunner-Munzel Test, Kruskal Wallis H Test, Wilcoxson Signed Rank Test
9. Diagnostic Tests for Model Assumptions: Multicollinearity and Homoscedascity using Variance Inflation Factor, Levene Test, Fligner Killeen Test

UNIT IV: Diagrammatic Representation and Thematic Mapping Lecture Hours: 15

10. Soil and Water Quality Analysis and Mapping: Soil Parameters (NPK, pH & Organic Matter); Water Quality Parameters (pH, Salinity and Dissolved Oxygen)
11. Environmental Indicator Mapping: Standardized Precipitation Index (SPI), Air Quality Index (AQI), Water Quality Index (WQI)
12. Socio-economic Indicator Mapping: Quintile Share Ratio, Multidimensional Poverty Index (MDPI), Gender Development Index (GDI)

SUGGESTED READINGS:

1. Abramovich, F., & Ritov, Y. (2024). Statistical Theory: A Concise Introduction (2nd ed.). CRC Press.
2. Alkire, S., Foster, J., Seth, S., Santos, M. M., Roche, J. M., & Ballon, P. (2015). Multidimensional Poverty Measurement and Analysis. Oxford University Press.
3. Alvi, Z. 1995: Statistical Geography: Methods and Applications, Rawat Pub. New Delhi
4. Belsley, D. A. (1991). Conditioning diagnostics: Collinearity and weak data in regression. John Wiley & Sons.
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6. Biswal, P. C. (2007). Probability and statistics. PHI Learning.
7. Chaurasia, S., & Gupta, A. D. (2014). Hand book of water, air and soil analysis (A lab manual). International E-Publication.
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11. Dorling, D. and Fairbirn, D. 1997: Mapping Ways of Representing the World, Longman. England.
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13. Gibbons, J. D., & Chakraborti, S. (2010). Nonparametric statistical inference (5th ed.). CRC Press.
14. Government of India Ministry of Women and Child Development. (2009). Gendering human development indices: Recasting the gender development index and gender empowerment measure of India. Ministry of Women and Child Development.
15. Gupta, S. C., & Kapoor, V. K. (2020). Fundamentals of mathematical statistics (12th ed.). Sultan Chand & Sons.
16. Harville, D. A. (2011). Matrix Algebra: Exercises and Solutions. Springer.
17. Hollander, M., Wolfe, D. A., & Chicken, E. (2013). *Nonparametric statistical methods* (3rd ed.). John Wiley & Sons.
18. Horn, R. A., & Johnson, C. R. (2012). Matrix Analysis (2nd ed.). Cambridge University Press.
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22. Lemeshko, B. Y. (2023). Universal goodness-of-fit tests for continuous distributions. Springer.
23. Mann, P. S. (2020). Introductory Statistics (10th ed.). John Wiley & Sons.
24. McDonald, D. (2014). Nonparametric Statistics for Non-Statisticians: A Step-by-Step Approach. John Wiley & Sons.
25. Meeker, W. Q., Escobar, L. A., & Pascual, F. G. (2022). Statistical methods for reliability data (2nd ed.). John Wiley & Sons.
26. Monkhouse F.J. and Wilkinson, H.R. 1971: Maps and Diagrams: Their Compilation and Construction, B.I. Publications Private Limited, New Delhi.
27. Montgomery, D. C., Peck, E. A., & Vining, G. G. (2021). Introduction to Linear Regression Analysis (6th ed.). John Wiley & Sons.
28. Montgomery, D. C., Jennings, C. L., & Kulahci, M. (2015). Introduction to time series analysis and forecasting (2nd ed.). John Wiley & Sons.
29. Olive, D. J. (2014). Statistical Theory and Inference. Springer Cham.

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32. Sarkar, A. 1997: Practical Geography: A Systematic Approach, Orient Longman Ltd., Hyderabad.
33. Sarkar, A. 2013: Quantitative Geography: Techniques and Presentations, Orient Blackswann.
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35. Taylor, S. (2017). Hypothesis Testing: A Visual Introduction to Statistical Significance. Vector Analytics.
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37. Tukey, J. W. (1977). Exploratory Data Analysis. Addison-Wesley.
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39. Vershynin, R. (2018). High-Dimensional Probability: An Introduction with Applications in Data Science (2nd ed.). Cambridge University Press.
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MINOR COURSE (CODE: GEOG8021)

GEOINFORMATICS AND SPATIAL INFORMATION TECHNOLOGY
Credit: 4

Lecture hours:60 Total Marks:75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective:
The primary objective of the course is to make the student understand the foundational aspects of remote sensing and GIS for being ready for further explorations in this field.

Learning Outcome:
After learning the course, the student is expected to have a theoretical understanding of the discipline of geoinformatics and spatial science.

Professional Skill Development:
The skills developed and acquired in this course may help the students for pursuing further studies in geoinformatics, satellite remote sensing and spatial information technology.

Unit-I **Lecture Hours: 30**

1. Concept & Types of Remote Sensing, EMR
2. Advantages of Remote Sensing and GIS over Conventional Surveying Techniques
3. Bands: Visible, Infra-red (NIR & SWIR), Sensor, Resolution, FCC: Case studies of IRS and LANDSAT
4. Procurement and downloading of open-source GIS data and softwares, Applications in earth and environmental sciences

Unit-II **Lecture Hours: 30**

5. Spatial Information: Concepts, Definitions and Sources
6. Role of Spatial Information in Decision making
7. Sources of Error in Spatial Data
8. Spatial Data Platforms: USGS, BHUVAN, BHUNIDHI

SUGGESTED READINGS:

1. Bhatta, B. (2021). Remote Sensing and GIS (3rd Edition). OUP India.
2. Burger, W., & Burge, M. J. (2016). Digital image processing: An algorithmic introduction (2nd ed.). Springer.
3. Campbell, J .B. 1996: Introduction to Remote Sensing, 2nd edition, Taylor & Francis, London
4. Chaisman, N. 1992: Exploring Geographical Information Systems, John Wiley and Sons Inc., New York.
5. Chang, K. (2016). Introduction to geographic information systems (8th ed.). McGraw-Hill Education.
6. de Carvalho Alves, M., & Sanches, L. (2023). Remote sensing and digital image processing with R. CRC Press.
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8. Heywood, D. I., Cornelius, S. C., & Carver, S. J. (2011). An Introduction to Geographical Information Systems (4th ed.). Pearson Prentice Hall.
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11. Li, J., Du, Q., Chanussot, J., Li, W., Xi, B., Song, R., & Li, Y. (Eds.). (2024). Remote sensing image classification and semantic segmentation. MDPI Books.
12. Lillesand, T.M. and Kiefer, R. W. 1994: Remote Sensing and Image Interpretation, 3rd edition, John Wiley and Sons, New York.
13. Marcolongo, B. And Mantorani, F. 1997: Photogeology: Remote Sensing Application in Earth Science, Oxford and IBH Pub. Pvt. Ltd., New Delhi
14. Rajan, M.S. 1995: Space Today, 2nd edition, National Book Trust, New Delhi.
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17. Sabins, F.F., 1997: Remote Sensing: Principles and Applications, 3rd edition, W.H. Freeman & Company, New York.
18. Tomaszewski, B. (2020). Geographic Information Systems (GIS) for Disaster Management (2nd ed.). Routledge.