

National Education Policy-2020

Common Minimum Syllabus for Uttarakhand State Universities and Colleges Fourth Year Undergraduate Programme- FYUP/Honours Programme (7th and 8th Semester)

2025

**DEPARTMENT OF GEOGRAPHY
DSB CAMPUS, KUMAUN UNIVERSITY
NAINITAL**

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NEP Tentative Course Structure Geography

Sem.	Core Discipline Specific Course (DSC) 4	DSE/GE 4		Total Credit
VII	DSC7 (3+1=4) GG.DSC07-T: <u>Theory (3)- Advanced Geomorphology</u> <u>Practical-(1)</u> GG.DSC07-P: Mapping of Landforms	Choose three DSE (3x4) courses OR Choose two DSE- (2x4) and one GE (4) course OR Choose one DSE (4) and two GE (2x4) courses (total = 12) GG.DSE07-Ti: DSE (3) -Urban Geography GG.DSE07-Pi: Pract. (1): Urban Data Analysis GG.DSE07-Tii: DSE (3) -Climate Change and Adaptation GG.DSE07-Pii: Pract: Exercises based of Climatological Data GG.DSE07-Tiii: DSE (3) – Paleogeography GG.DSE07-Piii: Pract. (1): Introduction to Dating Techniques and Methods GG.GE07-Ti: GE- Remote Sensing GG.DSE07-Tii: GE- Emerging Geographical thoughts	Dissertation on Major (6) OR Dissertation on Minor (6) OR Academic project/ Entrepreneurship (6)	
	4	12	6	22
VIII	DSC8 (3+1=4) GG.DSC08-T: <u>Theory (3)- GIS and GPS</u> GG.DSC08-P: <u>Practical (1)</u> GIS & GPS/DGPS Mapping	Choose three DSE (3x4) courses OR Choose two DSE- (2x4) and one GE (4) course OR Choose one DSE (4) and two GE (2x4) courses (total = 12) GG.DSE08-Ti: DSE (3) – Aeolian Geomorphology GG.DSE08-Pi: Pract. (1): Identification of Aeolian Landforms and Mapping GG.DSE08-Tii: DSE (3) - Soil Geography GG.DSE08-Pii: Pract. (1): Identification of Soil Characteristics GG.DSE08-Tiii: DSE (3) - Environmental Management & Sustainable Development GG.DSE08-Piii: Pract.(1): Field Visit and Report writing GG.GE08-Ti: GE - Political Geography GG.GE08-Tii: GE - Oceanography	Dissertation on Major (6) OR Dissertation on Minor (6) OR Academic project/ Entrepreneurship (6)	
	4	12	6	22

PROGRAMME OUTCOMES [POs]:

PO1: Enrichment of Intellectual Ability: The programme develops students' comprehensive understanding of the various dimensions of geographical and interdisciplinary knowledge and field realities. It acquaints students with the major concepts, thoughts, and ideas of both conventional and modern branches of Geography and interdisciplinary streams of knowledge, and their field applications. It also enriches their analytical, critical, creative faculties.

PO2: Inculcation of Planning Abilities: The programme develops effective planning abilities including time management, resource management, delegation skills and organizational skills of students which may develop their leadership qualities.

PO3: Appropriate Application of Knowledge Methodological Tools: The programme makes a sincere attempt of familiarizing students with critical knowledge and methodological tools which help them in making applications of new ideas, thoughts, and concepts in the real world.

PO4: Formation of Professional Identity: The programme intends to develop professional skills among students that would help them in building their professional identity as well becoming professional leadership from local to global level.

PO5: Developing Communicative Competence: The programme intends to develop grammatical and communicative competence among students and make them aware of the nature, form and function of Hindi and English languages. The programme therefore nurtures listening, writing, speaking and reading skills of students which allow them to communicate effectively and improves their access to new knowledge.

PO6: The knowledge, Knower and Society: The programme disseminates the fact the conception and distribution of knowledge in any form seems meaningless unless it is seen functioning in a society which is defined by the existence of human beings. Thus, the programme intends to integrate knowledge with the human society and nature. This will help in Creating a Sustainable, Flexible, Enduring and Peaceful Global Society.

PO7: Environment and Sustainability: The unprecedented growth and development have disrupted the nature as well as natural resources. In view of this, the programme intends to prepare students to respond to some major issues of environmental conservation and sustainable development. **PO8: Lifelong Learning:** The programme would motivate and inspire the students to strive on the path of lifelong learning as creation and acquaintance of emerging knowledge and ideas.

Programme Specific Prerequisites: To acquire Bachelor (Research) of Arts/science degree, in Geography, a student should have obtained three-year Bachelor of Arts/Science degree from any recognized university.
Programme specific outcomes (PSOs): <i>UG IV Year / Bachelor of Arts/Science (Honors/Research)</i>
1. The course intended to establish foundation of research in geographical sciences by teaching advanced core and sub-disciplines of Geography. 2. The students are enabled to engage in laboratory and field survey together to enhance their knowledge in applied geography subjects, such as Demographic science, Advanced Geospatial science. 3. Introduction of Geospatial science encouraged students to participate in advance surveying techniques for better understanding the current scenario and helps them to collect research specific data. 4. The purpose of this course is to introduce students to the process of conducting Physical and social geography research projects. The student will be to conceptualize, design and execute a research project by a teacher guide. 5. The students have to identify the objectives related to the topic of research project proposed.

**Department of Geography
(Semester VII)**

Sem.	Core Discipline Specific Course (DSC) 4	DSE/GE 4		Total Credit
VII	DSC7 (3+1=4) GG.DSC07-T: <u>Theory (3)</u>- Advanced Geomorphology <u>Practical-(1)</u> GG.DSC07-P: Mapping of Landforms	Choose three DSE (3x4) courses OR Choose two DSE- (2x4) and one GE (4) course OR Choose one DSE (4) and two GE (2x4) courses (total = 12) GG.DSE07-Ti: DSE (3) -Urban Geography GG.DSE07-Pi: Pract. (1): Urban Data Analysis GG.DSE07-Tii: DSE (3) -Climate Change and Adaptation GG.DSE07-Pii: Pract: Exercises based of Climatological Data GG.DSE07-Tiii: DSE (3) – Paleogeography GG.DSE07-Piii: Pract. (1): Introduction to Dating Techniques and Methods GG.GE07-Ti: GE- Remote Sensing GG.DSE07-Tii: GE- Emerging Geographical thoughts	Dissertation on Major (6) OR Dissertation on Minor (6) OR Academic project/ Entrepreneurship (6)	
	4	12	6	22

DEPARTMENT OF GEOGRAPHY

B.A./B.Sc.

DISCIPLINE SPECIFIC CORE COURSE (DSC)- Advanced Geomorphology

Programme: Under Graduate in Arts		Year: IV	Semester: VII Paper-	
Subject: Geography		Course Code: GG.DSC07-T	Course Title: Advance Geomorphology	
Course Outcomes This course will familiarize the students with the need for understanding of geomorphology with reference to certain fundamental concepts, focusing on the unity of geomorphology in the earth materials and the processes with or without an element of time. Process component of geomorphology is segmented into the internal and external processes of landscape evolution. Finally, a few selected applications of geomorphology to societal requirements and quality of environment are dealt with.				
Theory Credits: 03	Distribution of marks according the University rule.			
Total No. of Lectures – Tutorials – Practical (in hours per week): 3-0-1			15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Units	Course Content			Lectures
Unit – I	Conceptual Base: Nature, Scope, Trends and Development of Geomorphology; Classical Landscape Evolution / Development Theories: (W.M. Davis, W. Penck, L.C. King, Hack); Recent Trends in Geomorphology			14
Unit – II	Landscape Dating and Evolution: Radiocarbon dating, tree-ring dating (Dendrochronology), and Lichenometry. Interruptions in the evolution of landforms: Polycyclic landforms			15
Unit– III	Theories and Techniques: Theories of Hill-slope Evolution; Erosion Surfaces; Geomorphic Mapping Techniques; Systems and Models in Geomorphology. Applied Geomorphology: Geomorphic Hazards and Mitigation Measures; Geomorphology in Civil Engineering; Geomorphology and Groundwater Studies; Soil and Geomorphology; Application of geomorphology in agriculture and resource Management.			16
Practical (Credit-1) GG.DSE07-P	Course Title: Mapping of Landforms: Preparation of Relief map, slope map and Relief profile using topographical maps in GIS platform. Preparation of geomorphological map using Polish Legend System.			30

Suggested Readings:

1. Bloom, A.L. (1978), A Systematic Analysis of late Cenozoic Landforms, Englewe Cliffs, M.J. Prentice Hall.
2. Condie, K.C. (1989), Plate Tectonics and Crustal Evolution. Pergamon Press. New York.
3. Chorley, R.J., (ed.) Spatial Analysis in Geomorphology, London, Methuen.
4. Chorley, R.J., S.A. Schum and D.E. Sugden (1985): Geomorphology, London
5. Coats, D.R. (1981. ed.). Geomorphology and Engineering, George Allen and Unwin, London.
6. Cooke, R.U. and J.C. Doornkamp (1974), Geomorphology in Environmental Management, Oxford University Press.
7. Embleton, C. and J. Thornes : Processes in Geomorphology, London, Edward Arnold.
8. Garner, H.F. The Origin of Landscape – A Synthesis of Geomorphology, Oxford University Press, London, 1974.
9. Goudie, A. (ed.) (1990): Geomorphological Techniques. London, George Unwin and Hyman.
10. Hart, M.G. (1986) : Geomorphology : Pure and Applied, George Allen and Unwin, London.
11. Holmes, A., (1978), Principles of Physical Geology, 3rd Edn. London . Nelson.
12. Huggett, R.J. 2011. Fundamentals of Geomorphology, Routledge, New York.
13. Condie, K.C. 2003. Plate Tectonic and Crustal Evolution, Butterworth-Heinemann, Oxford, Burlington.
14. Singh, S. (2000): Geomorphology. (in Hindi). Vasundhra Prakashan, Gorakhpur.
15. Singh, S. (2004): Geomorphology, Prayag Pustak Bhawan, Allahabad
16. Kale, V. and Gupta, A. (2001): Elements of Geomorphology. Oxford University Press, Delhi.
17. King, C.A. M., Techniques in Geomorphology : London : Edward Arnold.
18. Leopold, L.B., Fluvial Processes in Geomorphology.
19. Ollier, C.D., Weathering, Edinburgh : Oliver and Royd.
20. Tectonics and Landforms. London: Methuen.
21. Pande, Anita (2014), Mountain Landform (An Investigation from Himalaya), Kathachitra Prakashan, Lucknow, ISBN No. 978-93-82001-09-06
22. Pitty, A.F., Geomorphology and Rural Settlement in India.
23. Scheidegger, A.E., Theoretical Geomorphology. Berlin : Springer – Verlag.
24. Thornbury, W.D., (1969), Principles of Geomorphology. New York : Wiley (1969).

DEPARTMENT OF GEOGRAPHY
B.A./B.Sc.

DISCIPLINE SPECIFIC CORE COURSE (DSE) Urban Geography

Programme: Under Graduate in Arts/Science		Year: IV	Semester:VII	Paper-
Subject: Geography Course		Course Code: GG.DSE07-Ti	Course Title: Urban Geography	
Course Outcomes To familiarize student with the nature and scope of urban geography. To understand the morphology and hierarchy in urban system. To learn about the importance of urban issues in mega- cities. To provide knowledge about urban planning and governance. To make students learn about the new perspectives of futuristic cities.				
Theory Credits: 03		Distribution of marks according the University rule.		
Total No. of Lectures – Tutorials – Practical (in hours per week): 3-0-1 15 hrs for 1 credit theory, 30 hrs for 1 credit practical				
Units	Contents			Lectures
Unit – I	Definition of urban places, Urbanism and urbanisation, Meaning and characteristics, Theories of urban origins, Trends of urbanization in developed and developing countries.			14
Unit – II	Towns and culture, Origin and growth of ancient towns, Modern towns and their problems, Urban morphology, Urban Problems and response in less developed countries: poverty, inadequate housing (slums), Lack of urban services, transportation problems			15
Unit – III	Growth and spatial pattern of urbanisation in India, State of urban infrastructure, slums, urban agglomeration, megacities, urban sprawl (In India), Challenges of urbanisation in India			16
Practical (Credit-1) GG.DSE07-Pi	Course Title: Urban Data Analysis: Rank Size Distribution of Towns: Zipf and Berry – Garrison; Population Density Gradient in Urban area, Measures of Centrality- Losche; Classification of Towns: Functional Classification - Harris and Nelson.			30

Suggested Readings

1. Bansal, S.C. (2007). *Nagriye Bhugol*. Meenakshi Publication, Meerut.
2. E. G. Andrew et al. (2015). *Urban Geography: A Critical Introduction*, Wiley Blackwell
3. Morgan, F.W. *Ports and Harbours*. [Date unknown].
4. Pacione, M. (2009). *Urban Geography: A Global Perspective*. Taylor and Francis, UK.
5. Paul L Knox and Linda MacCarthy (2011). *Urbanization: An introduction to urban geography*, Pearson.
6. Kaplan, D. H., Wheeler, J. O., & Holloway, S. R. (2008). *Urban Geography*. John Wiley, New York.
7. Ramachandran, R. (1992). *Urbanisation and Urban Systems of India*. Oxford University Press, New Delhi.
8. Singh, S., & Saroha, J. (2021). *Urban Geography*. Pearson Education.
9. Shekhar Ravi (2018). *Urbanization in India: Growth and Pattern*, Research India Press
10. Misra, R.P. (2013). *Urbanisation in South Asia*. Cambridge University Press, New Delhi.

DEPARTMENT OF GEOGRAPHY

B.A./B.Sc

DISCIPLINE SPECIFIC ELECTIVE (DSE)- Climate Change and Adaptation

Programme: Under Graduate in Arts/Science		Year: IV	Semester: VII	Paper-
Subject: Geography Course		Course Code: GG.DSE07-Tii	Course Title: Climate Change and Adaptation	
Course Outcomes The learning objectives encompass understanding the foundational elements of climate and its relationship with other sciences, alongside examining the concept and global trends of climate change, with a focus on the Himalayan region. Participants will analyze the region's vulnerability to climate change-induced natural disasters, such as droughts and high-intensity rainfall, and assess their impacts on the environment, society, and economy. Moreover, they will explore adaptation strategies, including community-based approaches, and the role of local institutions in mainstreaming adaptation and disaster risk reduction into development planning.				
Theory- (Credit-3)	Distribution of marks according the University rule			
Total No. of Lectures – Tutorials – Practical (in hours per week): 3-0-1			15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Units	Contents			Lectures
Unit – I	Elements of Climate: Nature and Scope and Relationship with other Sciences; Understanding Climate Change; Concept of Climate Change; Global Trends of Climate Change; Assessment of Climate Change over mountains.			14
Unit – II	Trends of Climate Change in Himalaya: Himalaya as Climate Change Hot Spot; Trends of Climate Change in Himalaya: Rainfall, Temperature and Extreme Weather Events.			16
Unit – III	Climate Change Vulnerability and adaptation: Concept of Vulnerability and Risk; Assessment of Climate Change Vulnerability and Risk; Upstream downstream linkage of Climate Change; Climate Change Adaptation in Himalaya: Concept of Climate Change, Adaptation; Types of Climate Adaptation; Role of Local Institutions in climate Change Adaptation; Mainstreaming Climate Change Adaptation and Disaster Risk Reduction into Development Planning; Community Based Climate Change Adaptation.			16
Practical (Credit-1) GG.DSE07-Pii	Course Title: Exercises based on Climatological Data: Changes in temperature (changes in land Surface Temperature, changes in Sea Surface Temperature); Variation in Rainfall and Ice melting and Sea level Rise			30

Suggested Readings:

- Adger, W. N., Arnell, N. W., & Tompkins, E. L. (2005). Successful adaptation to climate change across scales. *Global Environmental Change*, 15(2), 77–86. <https://doi.org/10.1016/j.gloenvcha.2004.12.005>

2. Adger, W. N., Lorenzoni, I., & O'Brien, K. (Eds.). (2009). *Adapting to climate change: Thresholds, values, governance*. Cambridge University Press.
3. Agarwal, A., & Narain, S. (2010). *Global warming in an unequal world: A case of environmental colonialism*. Centre for Science and Environment.
4. Dubash, N. K. (Ed.). (2012). *Handbook of climate change and India: Development, politics and governance*. Oxford University Press.
5. Field, C. B., Barros, V., Stocker, T. F., & Dahe, Q. (Eds.). (2007). *Climate change 2007: Impacts, adaptation and vulnerability (Contribution of Working Group II to the Fourth Assessment Report of the IPCC)*. Cambridge University Press.
6. Field, C. B., Barros, V., Stocker, T. F., & Dahe, Q. (Eds.). (2007). *Climate change 2007: Impacts, adaptation and vulnerability (Contribution of Working Group II to the Fourth Assessment Report of the IPCC)*. Cambridge University Press.
7. Goodell, J. (2023). *The heat will kill you first: Life and death on a scorched planet*. Little, Brown and Company.
8. Hulme, M. (2009). *Why we disagree about climate change: Understanding controversy, inaction and opportunity*. Cambridge University Press.
9. Kabat, P., van Vierssen, W., Veraart, J., Vellinga, P., & Aerts, J. (Eds.). (2012). *Climate change adaptation in the water sector*. Earthscan.
10. Kelkar, U., & Bhadwal, S. (2007). *Adaptation to climate change in Asia: A study of seven vulnerable countries*. TERI Press.
11. Klein Salamon, D. (2022). *Learning to adapt: Resilient cities in the age of climate crisis*. Island Press.
12. Klein, R. J. T., Midgley, G. F., Preston, B. L., Alam, M., Berkhout, F. G. H., Downing, T. E., & Shaw, M. R. (2014). Adaptation opportunities, constraints, and limits. In C. B. Field et al. (Eds.), *Climate change 2014: Impacts, adaptation, and vulnerability* (pp. 899–944). Cambridge University Press.
13. Lynas, M. (2007). *Six degrees: Our future on a hotter planet*. National Geographic.
14. Moser, S. C., & Boykoff, M. T. (Eds.). (2013). *Successful adaptation to climate change: Linking science and practice*. Routledge.
15. Portner, H.O., Roberts, D. C., Tignor, M., Poloczanska, E. S., Minterbeck, K., Alegría, A., ... & Rama, B. (Eds.). (2022). *Climate change 2022: Impacts, adaptation and vulnerability*. Cambridge University Press.
16. Ramaswamy, R. (2010). *Managing climate change: India's response*. Oxford University Press.
17. Schipper, E. L. F., & Burton, I. (Eds.). (2009). *The Earthscan reader on adaptation to climate change*. Routledge.
18. Siders, A. R. (2020). *Managed retreat: Strategic relocation from climate-changed areas*. Columbia University Press.
19. Singh, S., & Chaturvedi, R. K. (2015). *Climate change and India: Vulnerability assessment and adaptation*. Universities Press.
20. Srinivasan, J. (2020). *Climate change and India: Challenges and opportunities*. Indian Academy of Sciences.
21. Stern, N. (2006). *The economics of climate change: The Stern review*. Cambridge University Press.
22. TERI. (The Energy and Resources Institute). (2014). *Adaptation to climate change in the context of sustainable development*. TERI Press.

DEPARTMENT OF GEOGRAPHY
M.A./M.Sc.
DISCIPLINE SPECIFIC ELECTIVE (DSE) – PALEOGEOGRAPHY

Programme: Post Graduate in Arts/Science		Year: IV	Semester: VII	Paper: Paleogeography
Subject: Geography				
Course Code: GG.DSE07-Tiii			Course Title: Paleogeography	
Course Outcomes				
1. Describe the evolution of tectonic plates and its impact on paleogeography. 2. Recognize facies concepts and index fossils, aiding in stratigraphic analysis. 3. Identify the distribution of life forms and fossils across geological eras, providing insights into Earth's past environments. 4. Apply paleogeographic reconstruction approaches to understand past climates and landscapes. 5. Utilize dating techniques such as radiocarbon dating and dendrochronology to determine ages of geological formations and events.				
Theory Credits: 03	Distribution of marks according the University rule			
Total No. of Lectures – Tutorials – Practical (in hours per week): 3-0-1			15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Unit	Course Content			Lectures
Unit – I	Introduction to Paleogeography: Nature and Origin of Paleogeography, Origin and Evolution of Tectonic Plates and ocean basins, Volcanic Distribution over time.			14
Unit – II	Facies concept in stratigraphy, Index fossils, Igneous phenomena, Tectonic phenomena, Rock Suites and petrographic provinces. Geological Time: Geological eras and their sub-divisions: Paleo-biogeography: Atmospheric Evolution; Distribution of life forms/fossils of the time; Faunal Traces; Floral Traces; Indian records of fossils			15
Unit – III	Paleogeographic Reconstruction Approaches: Paleo climatic Reconstructions; Paleogeomorphology Reconstructions; Reconstruction of Soil Cover, profiles of fossil soils, profiles of morainic/glacio-landscape, alluvial and fluvio-glacial deposits.			16
Practical Credit (01) GG.DSE07-Piii	Course Title: Introduction to Dating Techniques and Methods: Preparation of Practical file – of existing data on Radiocarbon dating; Incremental Methods – dendrochronology (tree-ring dating), Varve Chronology; Age estimate dating - OSL and TSL methods			30

Suggested Readings

1. Ager, D.V. (1973). The Nature of the Stratigraphical Record. London: Macmillan.
2. Ali, J.R., & Aitchison, J.C. (2005). Gondwana to Asia: Plate Tectonics and Paleogeography. London: Geological Society Special Publications.
3. Auden, J.B. (1953). Geology of the Himalayas. London: Longmans.
4. Bangar, K.M. 2020, Principles of Engineering Geology, Standard Publishers Distributors, ISBN-13 978-8180141157
5. Blakey, R.C. (2012). Paleogeography: Understanding the Changing Earth. Cambridge: Cambridge University Press.
6. Bond, G.C. (1979). Paleogeography of North America During the Precambrian. Boulder: Geological Society of America.
7. Boucot, A.J., & Gray, J. (2001). A Critique of Phanerozoic Climate Models. Boulder: Geological Society of America.
8. Brenchley, P.J., & Harper, D.A.T. (2009). Paleoenvironments and Paleogeography. Oxford: Blackwell Publishing.
9. Bullard, E., Everett, J.E., & Smith, A.G. (1965). The Fit of the Continents Around the Atlantic. London: Royal Society Publishing.
10. Chatterjee, S. (1984). The Rise of Birds. Baltimore: Johns Hopkins University Press.
11. Dalziel, I.W.D. (2013). Gondwana Paleogeography and Plate Tectonics. Cambridge: Cambridge University Press.
12. Dietz, R.S. (1961). Continent and Ocean Basin Evolution by Spreading of the Sea Floor. Nature Publishing Group.
13. Dott, R.H., & Batten, R.L. (1971). Evolution of the Earth (1st ed.). New York: McGraw-Hill.
14. Ghosh, R. (2002). Plate Tectonics and Paleogeographic Evolution of India. Kolkata: Allied Publishers.
15. Goswami, B.K. (2020). Himalayan Foreland Basin: Paleogeography and Stratigraphy. New Delhi: Springer India.
16. Gradstein, F.M., Ogg, J.G., & Smith, A.G. (2004). A Geologic Time Scale 2004. Cambridge: Cambridge University Press.
17. Holmes, A. (1951). The Age of the Earth. London: Nelson.
18. Holmes, A. (1965). Principles of Physical Geology (2nd ed.). London: Thomas Nelson.
19. Jain, S. (2003). Paleogeography of the Indian Subcontinent. New Delhi: Scientific Publishers.
20. King, L.C. (1967). The Morphology of the Earth. Edinburgh: Oliver and Boyd.
21. Krumbein, W.C., & Sloss, L.L. (1963). Stratigraphy and Sedimentation. San Francisco: W.H. Freeman.
22. Kupper, W. (1957). Palaeogeography of the Continents. New York: Springer-Verlag.

23. Lauri J. Pesonen, Johanna Salminen, Sten-Ake Elming, 2021, Ancient Supercontinents and the Paleogeography of Earth, Elsevier, ISBN 9780128185339 (ISBN10: 0128185333).
24. Lieberman, B.S. (2000). Paleobiogeography: Using Fossils to Study Global Change, Plate Tectonics, and Evolution. New York: Springer.
25. Mazumder, R. (2015). Precambrian Basins of India: Stratigraphic and Tectonic Context. Amsterdam: Elsevier.
26. Mohanty, A.K. (2017). Tectonics and Paleogeography of the Indian Plate. New Delhi: Primus Books.
27. Paul Upchurch Alistair J. McGowan, Claire S.C. Slater, 2011, Paleogeography and Paleobiogeography Biodiversity in Space and Time, CRC Press Taylor & Francis Group 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL 33487-2742
28. Prothero, D.R. (2004). Bringing Fossils to Life: An Introduction to Paleobiology (2nd ed.). New York: McGraw-Hill.
29. Ramkumar, M. (2010). Geological Evolution of India: Precambrian, Proterozoic, and Phanerozoic. New Delhi: New India Publishing Agency.
30. Ravindra Kumar (1982): Fundamentals of Historical Geology and Stratigraphy of India. Willey Eastern Ltd.
31. Scotese, C.R. (2016). Paleogeographic Maps of the Past 750 Million Years. Evanston: PALEOMAP Project.
32. Scotese, C.R. (2021). PALEOMAP PaleoAtlas for ArcGIS. Evanston: PALEOMAP Project.
33. Scotese, C.R. (2025). Paleogeographic Maps of the Future. Evanston: PALEOMAP Project.
34. Shukla, U.K. (2011). Paleoclimatology and Paleogeography of Peninsular India. New Delhi: Macmillan India.
35. Smith, A.G., Smith, D.G., & Funnell, B.M. (2004). Atlas of Mesozoic and Cenozoic Coastlines. Cambridge: Cambridge University Press.
36. Trond H. Torsvik, L. Robin M. Cocks , 2016, Earth History and Paleogeography, ISBN-1107105323, 978-1107105324
37. Valdiya, K.S. (1980). Geology of Kumaun Lesser Himalaya. Dehradun: Wadia Institute of Himalayan Geology.
38. West, W.D. (1962). Geology and Paleogeography of India. Calcutta: Geological Society of India.
39. Wicander, R., & Monroe, J.S. (2009). Historical Geology: Evolution of Earth and Life Through Time (6th ed.). Boston: Cengage Learning.
40. Yin, A., & Harrison, T.M. (2000). Geologic Evolution of the Himalayan-Tibetan Orogen. Palo Alto: Annual Reviews.

DEPARTMENT OF GEOGRAPHY
B.A./B.Sc. Geography
GENERIC ELECTIVE (GE)- Remote Sensing

Programme: Under Graduate in Arts/Science		Year: IV	Semester: VII
Subject: Geography		Course Code: GG.GE07-Ti	Paper-
Course Outcomes		Course Title: Remote Sensing	
1. Ability to apply remote sensing principles to analyze and interpret data collected from various sensors. 2. Competence in interpreting aerial photographs and understanding their geometric properties for accurate analysis. 3. Proficiency in utilizing thermal and microwave remote sensing data for geographical studies and resource management. 4. Skill in digital image processing techniques for enhancing and classifying remote sensing data. 5. Capacity to apply remote sensing techniques in real-world scenarios, such as terrain evaluation, land use planning, and forest resource management.			
Theory Credit:04	Distribution of marks according the University rule.		
Total No. of Lectures – Tutorials – Practical (in hours per week): 4-0-0		15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Unit	Course Content		No. of Lectures
Unit – I	Bases of Remote Sensing: Definition, interaction of Electro-Magnetic Radiation (EMR) with Atmosphere and Earth surface. Sensors and remote sensing data products.		14
Unit – II	Aerial Photographs and Photogrammetry: Types of aerial photos, fundamentals of air photographs interpretation. Geometry of aerial photographs: tilt and relief displacement.		14
Unit – III	Thermal and Microwave Remote Sensing: Types; Characteristics; utilization in Geographical studies		14
Unit – IV	Digital Image Processing: Restoration; Enhancement and Classification: supervised and unsupervised; Application of Remote Sensing in terrain evaluation, land use and forest resource inventory.		18

Suggested Readings

1. Avery, T.E. and Berlon, G.L. (1985): Interpretation of Aerial Photographs Burgess Minneapolis.
2. Barrett, E.C. and L.F. Curties (1982): Photo Interpretation, Mcmillan, New York.
3. Bhatta, B. (2011). Remote sensing and GIS (2nd ed.). Oxford University Press India.
4. Campbell, J. B., & Wynne, R. H. (2011). Introduction to remote sensing (5th ed.). Guilford Press.

5. Chatterjee, S. N. (2012). Fundamentals of remote sensing and its applications. SBS Publishers & Distributors Pvt. Ltd.
6. Cracknell, A. P. (2015). Introduction to remote sensing (2nd ed.). CRC Press.
7. Falls Church (1980): American Society of Photogrammetry, Manual of Remote Sensing, Falls Church.
8. Gupta, R. P. (2017). Remote sensing geology (3rd ed.). Springer India.(Classic Indian contribution focused on geological remote sensing.)
9. Jensen, J. R. (2007). Remote sensing of the environment: An Earth resource perspective (2nd ed.). Pearson Education.
10. Jha, C. S., & Dadhwal, V. K. (Eds.). (2020). Remote sensing applications: Society and environment in India. Springer.
11. Jha, C. S., & Goparaju, L. (Eds.). (2016). Remote sensing applications in environmental research. Springer India.
12. Liang, S. (2004). Quantitative remote sensing of land surfaces. Wiley-Interscience.
13. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). Remote sensing and image interpretation (7th ed.). Wiley India.
14. (Indian Edition distributed widely in India.)
15. Mather, P. M., & Koch, M. (2011). Computer processing of remotely-sensed images: An introduction (4th ed.). Wiley-Blackwell.
16. Nag, P., & Kudrat, M. (2018). Digital remote sensing. Concept Publishing Company.
17. Navalgund, R. R., Jayaraman, V., & Roy, P. S. (2013). Remote sensing applications: An overview. NRSC/ISRO, Hyderabad.
18. Patel, P., & Joshi, P. K. (2021). Remote sensing for natural resources management. Scientific Publishers India.
19. Pratt, W.K. (1978): Digital Image Processing Wiley, New York.
20. Rao, D.P.(eds.) (1998): Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad.
21. Reddy, A. M. (2008). Remote sensing and geographical information systems. BS Publications.
22. Richards, J. A. (2013). Remote sensing digital image analysis: An introduction (5th ed.). Springer.
23. Roy, P. S., & Roy, A. (2010). Land use and land cover mapping using remote sensing data. Indian Society of Remote Sensing (ISRS).
24. Sabins, F.F. (1986): Remote Sensing Principles and Interpretation, Freeman, New York.
25. Schowengerdt, R. A. (2006). Remote sensing: Models and methods for image processing (3rd ed.). Academic Press.
26. Sharma, P. K. (2019). Principles of remote sensing: Concepts and applications. CBS Publishers.
27. Singh, R. B., & Kumar, A. (Eds.). (2008). Remote sensing and GIS for environmental management. Rawat Publications.
28. Thenkabail, P. S. (2021). Remote sensing of global croplands for food security. CRC Press. (Author of Indian origin, internationally recognized.)
- Tiwari, K. C., & Saxena, A. (2009). Remote sensing and GIS applications in environmental management. Scientific Publishers.

DEPARTMENT OF GEOGRAPHY

B.A./B.Sc.

GENERIC ELECTIVE (GE) - Emerging Geographical thoughts

Programme: Under Graduate in Arts/Science		Year: IV	Semester: VII	Paper-
Subject: Geography Course		Course Code: GG.GE07-Tii	Emerging Geographical Thoughts	
Course Outcomes 1. On transacting this core course, the students will be able to grasp the unique disciplinary focus of Geography 2. Students will be able to identify the key debates that have shaped the subject 3. Students will be well acquainted with the changing paradigms in Geography and the emergence of modern geography				
Theory (Credit-4)	Distribution of marks according the University rule.			
Total No. of Lectures – Tutorials – Practical (in hours per week): 4-0-0			15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Unit	Contents			Lect
UNIT-1	Basic Concepts: Geography as the study of areal differentiation, environmental determinism to New Environmentalism and Political Ecology. Concepts of Space, Place, Environment, Time, Scale, and Spatial Organization. Region and Regional Typology; Classical and Critical Perspectives. Anthropocene Debate; Implications for geographical thinking. Methods and approaches of Geography			15
UNIT-II	Paradigm Shifts and Philosophical Contributions: The Quantitative Revolution; Critiques, and Contemporary Relevance; Humanistic and Phenomenological Geography; Contributions of Yi-Fu Tuan, Edward Relph, and others. Literary Geography and Geo humanities; Reading landscapes as texts. Philosophy and Geography: Contributions of Vidal de la Blache, Carl Sauer, David Harvey, Doreen Massey. Critical Realism and Geography.			15
UNIT-III	Emerging and Recent Trends: Qualitative Paradigms and Changing Paradigms in Geography, Critical and Radical Geographies, Postmodernism, Poststructuralism, and Postcolonialism, Decolonial and Indigenous Geographies			12
UNIT - IV	Modern Techniques and Concepts in Geography: Remote Sensing, systems approach and Geographic Information System.			18

Suggesting Readings:

1. Agnew, J., Livingstone, D. N., & Rogers, A. (Eds.). (2011). The SAGE handbook of geographical knowledge. Sage.
2. Berry Markble (eds.) (1968): Spatial Analysis, Prentice Hall.
3. Castree, N., Kitchin, R., & Rogers, A. (Eds.). (2013). A dictionary of human geography. Oxford University Press.
4. Chatterjee, S.P. (1964): Fifty Years of Science in India: Progress of Geography, Calcutta.
5. Cloke, P., Crang, P., & Goodwin, M. (2005). Introducing human geographies (2nd ed.). Routledge.
6. Cole and King (1968): Quantitative Geography; Techniques, Theories in Geography, JWS.
7. Cresswell, T. (2013). Geographic thought: A critical introduction. Wiley-Blackwell.
8. Dickinson, R.E. (1969): The Makers of Modern Geography.
9. Dikshit, R. D. (2006). Geographical thought: A contextual history of ideas (2nd ed.). Prentice-Hall of India.
10. Dikshit, R.D. (1997): Geographical Thought, Prentice Hall, India.
11. Freeman, T.W. (1961): A Hundred Years of Geography, London.
12. Gregory, D., Johnston, R., Pratt, G., Watts, M., & Whatmore, S. (Eds.). (2009). The dictionary of human geography (5th ed.). Wiley-Blackwell.
13. Haggett and Chorley (1967): Models in Geography, London.
14. Haggett, P. and Chorley (1969): Models in Geography, London.
15. Haggett, Peter (1975): Geography: A Modern Synthesis, New York.
16. Hartshorne, R. (1939): The Nature of Geography (https://files.cercomp.ufg.br/weby/up/214/o/Livro-The_Nature_of_Geography.pdf)
17. Harvey, D. (1969): Explanation in Geography, London.
18. Harvey, D. (2006). Spaces of global capitalism: Towards a theory of uneven geographical development. Verso Books.
19. Hubbard, P., Kitchin, R., & Valentine, G. (Eds.). (2004). Key thinkers on space and place. Sage.
20. Husain, M. (2004). Evolution of geographical thought (4th ed.). Rawat Publications.
21. Husain, Majid (2001): Evolution of Geographical Thought, Rawat.
22. Kapur, A. (2010). Indian geography: Voice of developing India. Concept Publishing Company.
23. Kuhn, T.S. (1962): The Structure of Scientific Revolution: Chicago.
24. Majid Husain. (2012). Models in geography. Rawat Publications.
25. Minshull, R. (1967): Regional Geography: Theory and Practice.
26. Minshull, R. (1970): The Changing Nature of Geography, London.
27. Mishra, R. P. (2002). Regional planning: Concepts, techniques, policies and case studies. Concept Publishing Company.
28. Peet, R. (1998/2000). Modern geographical thought. Blackwell Publishers.
29. (Still cited widely after 2000, reprinted several times.)
30. Pensore, B. (1952): Travels and Discovery in Renaissance.

31. Rana, L. (2021). Contemporary geographical thought: Issues and challenges. Sage Publications India.
32. Richard Peet (1998): Modern Geographical Thought: Badewell.
33. Singh, R. L. (2009). Foundations of geographical thought. National Geographical Society of India.
34. Singh, S. (2018). Philosophy and methodology of geography. Rawat Publications.
35. Thomas and Hugget (1980): Modeling in Geography, HRP.

Dissertation on Major / Dissertation on Minor / Academic project/Entrepreneurship

Programme: Under Graduate in Arts		Year: IV	Semester: VII
Subject: Geography			
Course Code: GG.DDPE07		Course Title: Dissertation on Major / Dissertation on Minor / Academic project/Entrepreneurship	
Outcome To learn how to select a Research Proposal based on research gap found during the literature survey or field observations made. Preparation of synopsis/outline will be also learned. Finally student will learn how to collect data and write a report based on the data analysis			
Credits: 06	Max. Marks: 100 (Evaluation by External & Internal Examiner) Dissertation: 75 Internal Assessment: Viva Voce + Attendance : 25 (20+5)		
The students will be required to select a topic and area of their interests with the help of their respective supervisors allotted to them by the Department. Research Project must be submitted to the Department one week before the commencement of the Theory Examinations. The size of the Dissertation normally ranges between 80 and 100 pages. The Research Project Dissertation will be evaluated by the external and internal examiners.			

**Department of Geography
(Semester VIII)**

Sem.	Core Discipline Specific Course (DSC) 4	DSE/GE 4		Total Credit
VIII	DSC8 (3+1=4) GG.DSC08-T: <u>Theory (3)</u>- GIS and GPS GG.DSC08-P: <u>Practical (1)</u> GIS & GPS/DGPS Mapping	Choose three DSE (3x4) courses OR Choose two DSE- (2x4) and one GE (4) course OR Choose one DSE (4) and two GE (2x4) courses (total = 12) GG.DSE08-Ti: DSE (3) – Aeolian Geomorphology GG.DSE08-Pi: Pract. (1): Identification of Aeolian Landforms and Mapping GG.DSE08-Tii: DSE (3) - Soil Geography GG.DSE08-Pii: Pract. (1): Identification of Soil Characteristics GG.DSE08-Tiii: DSE (3) - Environmental Management & Sustainable Development GG.DSE08-Piii: Pract.(1): Field Visit and Report writing GG.GE08-Ti: GE - Political Geography GG.GE08-Tii: GE - Oceanography	Dissertation on Major (6) OR Dissertation on Minor (6) OR Academic project/ Entrepreneurship (6)	
	4	12	6	22

DEPARTMENT OF GEOGRAPHY

B.A. /B.Sc.

DISCIPLINE SPECIFIC COURSE (DSC) – GIS and GPS

Programme: Under Graduate in Arts/Science		Year: IV	Semester: VIII	
Subject: Geography	Course Code: GG.DSC08-T		Course Title: GIS and GPS	
Course Outcomes It will introduce Geographic Information System (GIS) and Global Positioning System (GPS) as a tool of spatial science and will make understand the basic elements of GIS and GPS. Finally, with some examples the application of these tools will be known.				
Theory Credit:3	Distribution of marks according the University rule.			
Total No. of Lectures – Tutorials – Practical (in hours per week): 3-0-1			15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Units	Contents			Lectures
Unit – I	Geography and Geographical Information System: Geography as a spatial science; Basic concepts of GIS; Components & Elements of GIS. Map Characteristics: Geo-referencing, Scale, Map Resolution; Map Projections, Data Automation; Types of Information in a Digital Map; Attribute Information; Display Information; Layering.			14
Unit – II	Geographical Data Sets: Geographic Data Types; Spatial and Non-spatial data; Linkages and Matching, Principal Functions of GIS; Data Capture; Geographic Analysis; Scanning System; Data Conversion; Data Base and Spatial Data Management; Geo-Relational Data Model; Topological Data Structure; Attribute Data Management; Relational Database - Concepts & Model.			16
Unit – III	Global Positioning System: Basic Concepts; Components of a GPS; GPS Positioning Types; Accuracy of GPS; GPS Applications.			15
Practical (Credit-1) GG.DSC08-P	Course Title: GIS& GPS/DGPS Mapping: GPS/DGPS Handling, Data collection; Downloading data from GPS; Mapping and Editing of data; Map elements; Base Map Preparation.			30

Suggested Readings

1. Anji Reddy, M. (2008). Textbook of remote sensing and geographical information systems (2nd ed.). BS Publications.
2. Aroneff, S. (1989): Geographic Information System: A Management Perspective, DDL Publication, Ottawa.
3. Bhatta, B. (2011). Remote sensing and GIS (2nd ed.). Oxford University Press India.
4. Bolstad, P. (2016). GIS fundamentals: A first text on geographic information systems (5th ed.). Eider Press.
5. Chaudhary, P. (2012). GIS applications in rural development. Concept Publishing.
6. DeMers, M. N. (2009). Fundamentals of geographic information systems (4th ed.). Wiley.
7. El-Rabbany, A. (2002). Introduction to GPS: The global positioning system. Artech House.

8. Fraser Taylor, D.R. (1991): Geographic Information System, Pergamon Press Oxford.
9. Hegarty, C. J., & Chatre, E. (Eds.). (2020). Understanding GPS/GNSS: Principles and applications (3rd ed.). Artech House.
10. Heywood, I., Cornelius, S., & Carver, S. (2011). An introduction to geographical information systems (4th ed.). Pearson Education.
11. Jha, M. M. (2022). Applied GIS and spatial analysis in India: A practical approach. Sage Publications India.
12. Kennedy, M. (2013). Introducing Geographic Information Systems with ArcGIS (3rd ed.). Wiley.
13. Konecny, G. (2014). Geoinformation: Remote sensing, photogrammetry and geographical information systems. CRC Press.
14. Kumar, P. (2013). Fundamentals of GPS. Universities Press (India) Pvt Ltd.
15. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic information systems and science (4th ed.). Wiley.
16. Maquire, D.J.M.F. (1991): Goodchild Geographic information Systems: Principles and Application, Taylor & Francis, Washington.
17. Nag, P. (2005). Geographic information system: Concepts and business opportunities. Concept Publishing Company.
18. Pandey, P. (2021). GIS-based natural resource management. Studium Press.
19. Peterson, M. P. (2012). Online maps with APIs and WebServices. Springer.
20. Peuquet D.J. and D.F. Marble (1990): Introductory Reading in Geographic Information System, Taylor & Francies, Washington.
21. Roy, P. S. (2010). Geospatial techniques for natural resources management. New India Publishing Agency.
22. Sharma, V. K. (2002). Remote sensing for natural resources management and environmental monitoring. Capital Publishing Company.
23. Srivastava, P. K. (2015). Remote sensing and GIS: Applications in environmental sciences. Oxford Book Company.
24. Srivastava, P. K., Han, D., Rico-Ramirez, M. A., & Islam, T. (Eds.). (2018). Satellite remote sensing and GIS applications in agricultural meteorology. Springer India.
25. Star J. and J.E. Estes (1994): Geographic Information Sytems : An Introduction: Prentice Hall, Engleweed Cliff, New Jersey.
26. Tiwari, K. C. (2016). GIS and remote sensing applications in environmental management. Scientific Publishers.
27. Tiwari, K. C., & Joshi, P. K. (2023). Advanced GIS applications for sustainable development in India. Springer.
28. Van Sickle, J. (2020). GPS for land surveyors (5th ed.). CRC Press.
29. Zhang, J. (2017). Advanced GPS theory and applications. Springer.

DEPARTMENT OF GEOGRAPHY
B.A./B.Sc. Geography
DISCIPLINE SPECIFIC ELECTIVE (DSE) – AEOLIAN GEOMORPHOLOGY

Programme: Post Graduate in Arts/Science	Year: IV	Semester: VIII	Paper:
Subject: Geography			
Course Code: GG.DSE08-Ti		Course Title: Aeolian Geomorphology	
Course Outcomes			
1. Ability to recognize and interpret aeolian landforms and processes in different environments, applying knowledge of grain motion and wind erosion. 2. Competence in assessing the impacts of wind erosion on agricultural fields and implementing management strategies to control dust. 3. Proficiency in managing coastal dunes and semi-arid dune areas, including measures to prevent desertification with a focus on India. 4. Capability to collect climatic data, photographs, and other relevant information from aeolian regions, and prepare reports and atlases to document and analyze aeolian landforms and their distribution.			
Theory Credits: 03		Distribution of marks according the University rule.	
Total No. of Lectures – Tutorials – Practical (in hours per week): 3-0-1		15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Unit	Course Content		Lect.
Unit – I	Wind Environments: Introduction; desert wind systems; directional variability and resultant drift potential; scope of aeolian geomorphology. Grain in motion: fluid flows - flow types; interaction of the wind and the bed - wind shear; entrainment – lift and drag; Thresholds of movement: static and dynamic ; modes of transport: saltation, creep, reptation and suspension; transport rates.		14
Unit – II	Wind erosion and landforms: Processes: abrasion, deflation and aerodynamic erosion; Landforms: ventifacts, yardangs, pans, stone pavements, deflation hollows; desert varnish; processes and significance. Dusts-Sources; - contemporary and proximal, mineral composition; Dust-generating and dust yielding systems, gross spatial patterns of production and removal; deposition: loess, types, palaeo - environmental significance.		16
Unit – III	Forms of wind deposition: sand ripples, obstacle dunes; dune- classification schemes; morphodynamics of the crescentic, longitudinal and complex dunes; Plaeo—environments: Introduction; sediment movement in the past; relic and active dunes; dating aeolion deposits; Pre-Pleistocene sand dunes; Pleistocene and Holocene dunes; Aeolinites - composition and distribution.		15
Practical Credit (01) GG.DSE08-Pi	Course Title: Identification of Aeolian landforms and mapping: Collection of climatic data from various sources of Aeolian region and report making; Collection of Photographs of Aeolian landforms and Atlas Preparation with distribution and explanation.		30

Suggested Readings

1. Bagnold, R. A. (1954). The physics of blown sand and desert dunes. Methuen. (Foundational book.)
2. Bullard, J. E. (2011). Sand and dust storms: Environmental hazards. Routledge.
3. Bullard, J. E., & White, K. (2005). Dust production and sedimentary processes in deserts. Earth-Science Reviews.
4. Cooke, R., Warren, A., & Goudie, A. (1993). Desert geomorphology. UCL Press.
5. Das, G. (2011). *Arid landforms and processes in Rajasthan*. Rawat Publications.
6. Dhir, R. P. (1995). *The Thar Desert: Land, man, and environment*. Scientific Publishers.
7. Goudie, A. (2013). The human impact on the natural environment (7th ed.). Wiley-Blackwell.
8. Goudie, A. S. (1978). Dust storms and their geomorphological implications. Progress in Physical Geography.
9. Goudie, A. S., & Wilkinson, J. (1977). *Desert geomorphology: India and beyond*. Oxford University Press.
10. Greeley, R., & Iverson, J. D. (1985). Wind as a geological process: On Earth, Mars, Venus and Titan. Cambridge University Press.
11. Gupta, V. (2001). *Sand dune dynamics in the Thar Desert*. Rawat Publications.
12. Hastenrath, S. (1988). Climate and circulation of the tropics. Springer. (Includes aeolian processes.)
13. Kar, A. (1993). *Geomorphology and desertification in Thar Desert*. Scientific Publishers.
14. Kutra, I. (2014). Aeolian erosion: Monitoring, modeling and management. Springer.
15. Kaul, R. N. (1992). *Management of arid ecosystems: Indian experience*. Scientific Publishers.
16. Kaul, R. N., & Kulshreshtha, S. N. (1970). *Desert environment: A review*. Central Arid Zone Research Institute.
17. Kocurek, G. (1998). Eolian system sedimentology. SEPM Special Publications.
18. Lancaster, N. (1986). Dunes on the Namib Sand Sea: Geomorphology and processes. Geological Society of America.
19. Lancaster, N. (1995). Geomorphology of desert dunes. Routledge.
20. Lancaster, N. (2020). Dryland geomorphology: A global perspective. Wiley-Blackwell.
21. Livingstone, I., & Warren, A. (1996). Aeolian geomorphology: An introduction. Longman.
22. Mainguet, M. (1991). Desertification: Natural background and human mismanagement. Springer.
23. Mathur, R. P. (1980). *Arid region geomorphology: Studies from India*. University of Rajasthan.
24. McKee, E. D. (1979). A study of global sand seas. U.S. Geological Survey.
25. Middleton, N. (2017). Desert dust: Origins, consequences and management. Wiley.
26. Middleton, N., & Thomas, D. (1997). World atlas of desertification. United Nations Environment Programme.
27. Narain, P. (2006). *Desertification control in the Thar Desert of India*. Central Arid Zone Research Institute (CAZRI).
28. Nickling, W. G., & Neuman, C. M. (2009). Aeolian sediment transport: New insights from experiments and models. Springer.
29. Pye, K. (1987). Aeolian dust and dust deposits. Academic Press.

30. Pye, K., & Tsoar, H. (1990). *Aeolian sand and sand dunes*. Springer.
31. Sharma, H. S. (1990). *Indian geomorphology: Landforms and processes*. Concept Publishing.
32. Singh, S. (2005). *Geomorphology*. Prayag Pustak Bhawan.
33. Singh, S. (2012). *Arid zone geomorphology of India*. Rawat Publications.
34. Stokes, S., & Bray, H. (2005). *Late quaternary desert evolution: Geological and climatic controls*. Springer.
35. Thakur, V. C. (1988). *Desertification in western Rajasthan: A geomorphological analysis*. Geological Society of India.
36. Thomas, D. S. G. (1997). *Arid zone geomorphology: Process, form and change in drylands* (2nd ed.). Wiley.
37. Thomas, D. S. G., & Goudie, A. S. (2000). *The dictionary of physical geography* (3rd ed.). Blackwell Publishers.
38. Tsoar, H. (2001). Types of dunes and their formative conditions. *Geomorphology*.
39. Warren, A. (2013). *Dunes: Dynamics, morphology, history*. Springer.
40. Washington, R., & Todd, M. (2005). Atmospheric controls on mineral dust emission. *Earth-Science Reviews*.

DEPARTMENT OF GEOGRAPHY
B.A./B.Sc. Geography
DISCIPLINE SPECIFIC ELECTIVE (DSE) – Soil Geography

Programme: Under Graduate in Arts/Science		Year: IV	Semester: VIII Paper:
Subject: Geography			
Course Code: GG.DSE08-Tii		Course Title: SOIL GEOGRAPHY	
Course Outcomes 1. Ability to analyze the relationship between soil geography and pedology, applying concepts to understand soil formation and distribution. 2. Competence in identifying soil properties and morphology, including physical, chemical, and biological characteristics, and interpreting their implications for soil classification. 3. Proficiency in assessing soil formation processes and capabilities, applying classification systems to evaluate land suitability for various purposes. 4. Understanding of soil degradation mechanisms and management strategies, including the assessment of erosion factors and implementation of conservation measures. 5. Capability to conduct soil measurements and analyses, including pH, temperature, texture, and particle size, and to interpret aerial photographs and satellite imagery for soil mapping purposes.			
Credits: 03	Distribution of marks according the University rule.		
Total No. of Lectures – Tutorials – Practical (in hours per week): 3-0-1			15 hrs for 1 credit theory, 30 hrs for 1 credit practical
Units	Contents		No. of Lectures
Unit – I	Conceptual Base: Concept, scope, approaches and significance Soil Geography and its relationship with Pedology; Soil forming factors and processes.		14
Unit – II	Soil Properties & Morphology: Physical, Chemical and biological properties of soils		15
Unit – III	Soil Classification and Mapping: Genetic Classification of soils; Soil taxonomy: Soils orders and sub-order level; Soil Landscape Mapping. Soil Degradation & Management: Methods of Assessing Soil Erosion; Natural and Anthropogenic Factors of Soil Degradation; Soil Conservation and Management.		16
Practical Credit (01) GG.DSE08-Pii	Course Title: Identification of soil Characteristics: Measurement of pH value, and temperature; Identification of physical structure of soil, and soil horizons of a soil profile and preparation of diagrams; Determination of soil texture by feel method; Particle size analysis with plotting on ternary graph; Preparation of soil map using satellite data.		30

Suggested Readings

1. Backman, H.O and Brady, N.C. (1960): The Nature and Properties of Soils, Mc Millan New York.
2. Bennet, Hugh H. (1939): Soil Conservation, McGraw Hill, New York.
<https://archive.org/details/in.ernet.dli.2015.212071/mode/2up>
3. Bunting, B.T. (1973): The Geography of Soils, Hutchinson, London.
4. Clarke G.R. (1957): Study of the Soil in the Field, Oxford University Press, Oxford.
5. Coleman, D., Callaham, M. and Crossley, D. (2017): Book Review: Fundamentals of Soil Ecology (Third Edition).
<https://www.frontiersin.org/journals/environmental-science/articles/10.3389/fenvs.2018.00091/full>
6. Daniel Hillel (2007): Soil in the Environment 1st Edition. Academic Press.
7. Donald, Steila, Thomas E. Pond (1989): The Geography of Soils: Formation, Distribution, and Management, 2nd Edition.
<https://www.goodreads.com/book/show/9007134-the-geography-of-soils>
8. Foth H.D. and Turk, L.M. (1972): Fundamentals of Soil science, John Wiley, New York.
9. Govinda Rajan, S.V. and Gopala Rao, H.G. (1978): Studies on Soils of India Vikas, New Delhi.
10. Gurumurthy, P. (2023): Soils and Environment.
11. Kale, V.B. (2020): Soil Goegraphy. Himalaya Publishing House.
12. Kaleeswari, R.K., Rajeswari, R., Sivakumar, K.and Latha, M.R. (2023): Soil Degradation.
<https://www.satishserial.com/book/9789390660490/soil-degradation>
13. Kulkarni, N. and Aithal, S.C. (2017): Modern Approaches in Soil Agriculture and Environmental Microbiology. Himalaya Publishing House.
14. Mc. Bride, M.B. (1999): Environmental Chemistry of Soils, Oxford University Press, New York.
15. Michael J. Goss and Margaret Oliver (2023): Encyclopedia of Soils in the Environment, Second Edition.
<https://www.sciencedirect.com/referencework/9780323951333/encyclopedia-of-soils-in-the-environment#book-info>
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20. Russell, Sir Edward J. (1961): Soil Conditions and Plant Growth, Wiley, New York.
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DEPARTMENT OF GEOGRAPHY

B.A./B.Sc.

DISCIPLINE SPECIFIC ELECTIVE (DSE) – ENVIRONMENTAL MANAGEMENT & SUSTAINABLE DEVELOPMENT

Programme: Under Graduate in Arts/Science		Year: IV	Semester: VIII	Paper-
Subject: Geography	Course Code: GG.DSE08-Tiii	Course Title: Environmental Management and Sustainable Development		
Course Outcomes 1. Ability to analyze the interrelationship between environment and society, applying environmental geography concepts to understand human-environment interactions. 2. Competence in identifying and assessing environmental problems, including their causes, impacts, and potential solutions. 3. Proficiency in understanding the principles of sustainable development and applying them to promote sustainable practices in mountain agriculture and livelihoods. 4. Understanding of environmental management strategies and techniques, including integrated watershed management and disaster preparedness. 5. Capability to evaluate environmental changes and their consequences, develop environmental plans for sustainable development, and contribute to climate change adaptation efforts through practical field visits and report writing.				
Theory Credit:3	Distribution of marks according the University rule.			
Total No. of Lectures – Tutorials – Practical (in hours per week): 3-0-1			15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Unit	Course Content			Lectures
Unit – I	Conceptual Base: Environment: Concepts and Types; Environmental Perception; Environment and Society; Meaning, Scope and Significance of Environmental Geography; Approaches to the Study of Environmental Geography.			14
Unit – II	Environmental Problems:Types of environmental problems; causes and consequences of environmental problems at global regional and local levels; Global environmental change; Natural disasters; Environmental Impact Assessment (EIA); Sustainable Development: Concepts of Sustainable Development; Need of Sustainable Development; Sustainable Mountain Agriculture and Livelihood.			15
Unit – III	Environmental Management: Concept of Environmental Management; Approaches to Environmental Management; Integrated Watershed Management; Disaster Management; Environmental Management in Uttarakhand Himalaya. Environmental Changes – Causes & Consequences; Environmental Planning & Sustainable Development; Disaster Management; Climate, Change and Adaptation			16
Practical Credit (01) GG.DSE08-Piii	Course Title: Field Visit and Report writing			30

Suggested Readings:

1. Abu Samah, M.A. and Amri Kamarudin, Mohd K. (2022): Environmental Management and Sustainable Development Case Studies and Solutions from Malaysia. <https://link.springer.com/book/10.1007/978-3-030-93932-8>
2. Brundland, G. (1988) Our Common Future, Report of the World Commission on Environment and Development, UN.
3. Carpenter R A (ed) (1983): Natural Systems for Development: what planners need to know Mc. Millan London.
4. Cheremisinoff, P.N. & A.C. Morresi (1977): Environment Assessment and Impact studies Handbook. An Arbor, Mich: Anarbor Science.
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6. Das, M.C. (2019): Concepts of Environmental Management for Sustainable Development. Dreamtech Press.
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10. Omer, Abdeen M. (2015): Sustainable Development and Environment Management: Innovations, Sciences and Technologies. Nova Science Publishers.
11. Pande G.C. & D.C. Pandey (1999): Environmental Development and Management: Strategies and Policies (ed.), New Delhi.
12. Richard Welford (eds) (2016): Corporate Environmental Management 3: Towards Sustainable Development (Environmental Management Set). Routledge; 1st edition
13. Sahu, A.S. and Chatterjee, N.D. (2023): Environmental Management and Sustainability in India. <https://link.springer.com/book/10.1007/978-3-031-31399-8>
14. Shukla, V. and Kumar, N. (2020): Environmental Concerns and Sustainable Development (Volume 2: Biodiversity, Soil and Waste Management). <https://link.springer.com/book/10.1007/978-981-13-6358-0>
15. Singh, B. Vishvendra Raj and Batar, A.K. (2024): Sustainable Local Development for Environmental and Social Sustainability. <https://link.springer.com/book/10.1007/978-3-031-67303-0>
16. Ujikawa, K., Ishiwatari, M., Hullebusch, E.V. (2024): Environment and Sustainable Development Proceedings of the 2023 8th Asia Conference on Environment and Sustainable Development. <https://link.springer.com/book/10.1007/978-981-97-3320-0>
17. Venkatesan, G., Lakshmana Prabu, S. and Rengasamy, M. (Eds) (2022): Sustainability Studies: Environmental and Energy Management. Bentham Books Publication. <https://benthambooks.com/book/9789815039924/preface/>
18. Wathern, Peter (1986): Environmental Impact Assessment: Theory and Practice. Unwin & Hyman, London.

DEPARTMENT OF GEOGRAPHY
B.A./B.Sc.
GENERIC ELECTIVE (GE) – POLITICAL GEOGRAPHY

Program: Under Graduate in Arts/Science		Year: IV	Semester: VIII	Paper-
Subject: Geography Course		Course Code: GG.GE08-Ti	Course Title: Political Geography	
Course outcomes 1. Understand broad meaning and scope of Political Geography. 2. Learn about the concept of Nation and Nationalism. 3. Learn about Frontier and Boundaries. 4. Learn about theories of Geo-Strategic Views. 5. Understand Geopolitics of India.				
Theory Credits: 04	Distribution of marks according the University rule.			
Total No. of Lectures – Tutorials – Practical (in hours per week): 4-0-0			15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Unit	Course Content			Lectures
Unit – I	Definition, Nature and Scope; History and Development of Political Geography; Approaches to the Study of Political Geography.			10
Unit – II	Concept of Nation, State and Nation-State; Geographic Characteristics of States: Size, Shape, Location, Cores and Capitals; Nation Building/Nationalism.			10
Unit – III	Definition of Frontier and Boundaries; Distinction Between Frontier and Boundaries; Genetic, Functional & Morphological Classification of Boundaries.			12
Unit – IV	Global Geo-Strategic Views Related to Heartland and Rim land: Mackinder & Spykman; Cohen's Views; Unitary and Federal Forms of Governance. Political Geography of India; India's Neighbors & Geopolitical Study of Indian Ocean; Changing Political Map of India and Inter-state Disputes Related to Language and Others.			28

Suggested Reading

1. Adhikari, S. (2002). Political geography. Rawat Publications.
2. Agnew, J. (2003). Geopolitics: Re-visioning world politics (2nd ed.). Routledge.
3. Cohen, Samuel (1964) Geography and Politics in Divided World. Random House, New York.
4. Dalby, S. (2013). Security and environmental change. Polity Press.
5. De Blij, H. J. and Glassner, M. (1968) Syst. Political Geography. J. W. and Sons, New York.
6. Dikshit, R.D. (1987) Political Geography and Geopolitics. Tata McGraw Hill, New Delhi.
7. Dikshit, R.D. (2000) Political Geography: A Contemporary Perspective. P.-Hall, New Delhi.
8. Dodds, K. (2005). Global geopolitics: A critical introduction. Pearson Education.
9. Elden, S. (2013). The birth of territory. University of Chicago Press.
10. Flint, C. (2006). Introduction to geopolitics. Routledge.
11. Flint, C. (2020). Political geography: World-economy, nation-state, and locality (7th ed.). Routledge.
12. Flint, C. (2023). Geopolitical constructs: The multilayered dynamics of states, borders, and regions (2nd ed.). Routledge.
13. Gautam, A. (2018). Political geography of India. Sharda Pustak Bhawan.
14. Glassner, M. I., & Fahrner, C. (2004). Political geography (3rd ed.). Wiley.
15. Husain, M. (2007). Politics and geography. Rawat Publications.
16. Kaul, R. N. (2021). State, politics, and spatiality in India. Sage Publications India.
17. Mamadouh, V. (2002). Political geography: Space, place and politics. Routledge.
18. Misra, K. (2024). Political geography: Trends and theories in Indian context. (Upcoming, Sage India).
19. Murphy, A. B. (2018). The regional dynamics of language and identity in political geography. Taylor & Francis.
20. Nag, P. (2012). Geopolitical affairs and regional perspectives. Concept Publishing Company.
21. Nanda, R. (2022). Borders and borderlands: Geopolitical changes in South Asia. Orient BlackSwan.
22. Painter, J., & Jeffrey, A. (2009). Political geography: An introduction to space and power. Sage Publications.
23. Pandey, A. (2016). Contemporary issues in Indian political geography. Radha Publications.
24. Pannikar, K.M. (1959) Geographical Factors in Indian History. 2 vols. Asia. P. House Bombay
25. Percy, G. E. and Fifield, R. (1948) World Political Geography, Thomas Y Crowell, New York.
26. Pounds, N.J.G. (1972) Political Geography. McGraw Hill Publication., New York.
27. Sharma, P. R. (2013). Geopolitics and strategic geography of South Asia. Concept Publishing.
28. Short, John R. (1982) An Introduction to Political Geography. Routledge, London.
29. Siddiqui, K. (2011). Political geography: Concepts, methods and case studies. Gyan Publishing House.
30. Singh, J. (2020). Geopolitics: A contemporary perspective. Rawat Publications.
31. Singh, R. Y. (2010). Political geography. APH Publishing.
32. Singh, T. D. (1988) Hind Mahasagar Avam Parimandaliya Rashtra: Ek Bhougolik Adhyayan, Tara Book Agency, Varanasi.
- Taylor, P. J., Flint, C., & Waeber, O. (2007). Political geography: World-economy, nation-state and locality (5th ed.). Routledge

B.A./B.Sc
General Elective (GE) - Oceanography

Programme: Under Graduate in Arts/Science		Year: IV	Semester: VIII	Paper-
Subject: Geography Course		Course Code: GG.GE08-Tii	Course Title: Oceanography	
Course Outcomes Oceanography is a branch of science and important today as climate change, pollution, and other factors are threatening the ocean and its marine life. It also helps us predict long-term weather and climate changes, which leads to more efficient use of the Earth's resources. It also helps understand the effect of pollutants on ocean waters.				
Theory- (Credit-4)	Distribution of marks according the University rule.			
Total No. of Lectures – Tutorials – Practical (in hours per week): 4-0-0			15 hrs for 1 credit theory, 30 hrs for 1 credit practical	
Units	Contents			Lectures
Unit - I	Definition, scope and development of Oceanography, Distribution of water over the globe.			10
Unit - II	Relief of the ocean floor, Continental drift and ocean floor spreading, Composition of sea water.			15
Unit - III	Temperature in oceans, Salinity, density and water masses in oceans, Marine deposits.			15
Unit - IV	Coral landforms, Waves and tides, Ocean currents, Marine life. Oceanic Pollution; Possible natural disturbances causing pollution in oceans; Anthropogenic activities resulting in oceanic pollution; The United Nations Convention on the Law of the Sea (UNCLOS).			20

Suggested Reading:

1. Davis Richard J.A. (1986) "Oceanography - An Introduction to the Marine Environment" Wm. C.Brown Iowa.
2. Duxbury C.A. and Duxbury B. (1996) An Introduction to the World's Oceans. C. Brown Iowa 2nd ed.
3. Garrison, T. (2001) "Oceanography - An Introduction to Marine Science. Books/ Cole, Pacific Grove, USA,
4. Gross, M. Grant (1987) Oceanography, A View of the Earth, Prentice Hall Inc. New Jersey, 1987.
5. King, C.A.M. (1962) Oceanography for Geographers.
6. Singh Savindra., (2000), Oceanography, Prayag Pustak Bhavan, Allahabad.
7. Sharma, R.C. (1985) The Oceans" Rajesh New Delhi.
8. Ummerkutty, A.N.P. (1985) Science of the Oceans and Human Life, NBT, New Delhi

Dissertation on Major / Dissertation on Minor / Academic project/Entrepreneurship

Programme: Under Graduate in Arts/Science	Year: IV	Semester: VIII
Subject: Geography		
Course Code: GG.DDPE08	Course Title: Dissertation on Major / Dissertation on Minor / Academic project/Entrepreneurship	
Outcome To learn how to select a Research Proposal based on research gap found during the literature survey or field observations made. Preparation of synopsis/outline will be also learned. Finally student will learn how to collect data and write a report based on the data analysis		
Credits: 06	Max. Marks: 100 (Evaluation by External & Internal Examiner) Dissertation: 75 Internal Assessment: Viva Voce + Attendance: 25 (20+5)	
The students will be required to select a topic and area of their interests with the help of their respective supervisors allotted to them by the Department. Research Project dissertation must be submitted to the Department one week before the commencement of the Theory Examinations. The size of the Dissertation normally ranges between 80 and 100 pages. The Research Project Dissertation will be evaluated by the external and internal examiners.		