National Education Policy-2020

Common Minimum Syllabus for Uttarakhand State Universities and Colleges
PG Two Year Programme
(7^{th} to 10^{th} Semester)

2025

COURSE STRUCTURE FOR FYUP/MASTER'S
DEPARTMENT OF GEOGRAPHY
DSB CAMPUS, KUMAUN UNIVERSITY
NAINITAL

COMMITTEE OF BOARD OF STUDY

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Contents

NEP Tentative Course Structure
Geography

Sem.	Core Discipline Specific Course (DSC) 4	DSC/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**
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**

Sem.	Core Discipline Specific Course (DSC) 4	DSE/GE 4		Total Credit
IX	DSC9 (3+1=4) **GG.DSC09-T:** **<u>Theory (3)</u>** **Regional Geography of India** **GG.DSC09-P:** **<u>Practical (1)</u>** **Field Survey and Report Writing**	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.DSE09-Ti:** **DSE(3) Natural Resource Management** **GG.DSE09-Pi:** **Pract.(1): RS and GIS Application** **GG.DSE09-Tii:** **DSE(3) -Fluvial Geomorphology** **GG.DSE09-Pii:** **Pract. (1): Drainage Basin Morphometry** **GG.DSE09-Tiii:** **DSE(3) - Population Geography** **GG.DSE09-Piii:** **Pract. (1): Population Data Analysis** **GG.GE09-Ti:** **GE- Cultural Geography** **GG.DSE09-Tii:** **GE- Geography of Uttarakhand**	Dissertation on Major (6) OR Dissertation on Minor (6) OR Academic project/ Entrepreneurship (6)	
	4	**12**	**6**	**22**
X	DSC10 (3+1=4) **GG.DSC10-T:** **<u>Theory (3)</u> Hydrology** **GG.DSC10-P:** **<u>Practical (1)</u> Hydrological Data Analysis**	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.DSE10-Ti:** **DSE(3) - Glacial and Periglacial Geomorphology** **GG.DSE10-Pi:** **Pract. (1):Landform identification and mapping** **GG.DSE10-Tii:** **DSE (3) -Integrated Watershed Management** **GG.DSE10-Pii:** **Practical (1): Watershed Management** **GG.DSE10-Tiii:** **DSE(3) -Agricultural Geography and Agro-Ecosystem Management** **GG.DSE10-Piii:** **Pract. (1): Agricultural Statistics** **GG.GE10-Ti:** **GE - Conceptual Foundations & Perspectives of Sustainable Development** **GG.GE10-Tii:** **GE- Disaster Management**	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): *UG IV Year / Bachelor of Arts/Science (Honors/Research)*
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.

Programme Specific Prerequisites: To acquire Master of Arts/Science, in Geography, a student should have obtained three-year Bachelor of Arts/Science and one year Bachelor (research) of Arts/Science from any recognized university. Student should have research-oriented aptitude for gaining the advanced knowledge in the subject field so that he/she can apply the gained knowledge to resolve related research and professional issues.

Programme specific outcomes (PSOs): P*G I Year / Master of Arts/Science in Geography*

1. Establish the position of Geography as a subject and its importance and interrelationships that reiterate and validate the Man Environment relationship.
2. In the course of field surveys, students acquire a greater understanding of the socio-economic and cultural dimensions of the populations with greater focus on marginalized section of society.
3. Physical field surveys enable the students to understand the landforms, geomorphic process and associated hazards.
4. Provide training to students in handling modern instruments and methods like Aerial Photographs, Satellite Imagery, Total Station and Meteorological instruments.
5. Computer-based techniques (RS & GIS) are incorporated in the syllabus which prepares the students for further analytical studies.
6. The students are directed towards problem analysis so that they can design and conduct independent research.
7. The comprehensive syllabus promotes and develops a thorough knowledge of concepts, methods and theory.
8. The Ability Enhancement Course strives to develop communication powers in the student, both written and oral.
9. The Dissertations written by the students prepare them to examine social and environmental issues along with the causes, consequences and remedial measures emerging at local and national levels.
10. The syllabus is oriented towards emerging job opportunities and future prospects for the students.

Department of Geography
(Semester VII & VIII)

Sem.	Core Discipline Specific Course (DSC) 4	DSC/GE 4		Total Credit
VII	DSC7 (3+1=4) **GG.DSC07-T:** **Theory (3)- Advanced Geomorphology** **Practical-(1)** **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)	
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VIII	DSC8 (3+1=4) **GG.DSC08-T:** **Theory (3)- GIS and GPS** **GG.DSC08-P:** **Practical (1)** **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**	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 Cenozonic Landforms, Englewe Cliffs, M.J. Prentice Hall.
2. Condle, K.C. (1989), Plate Tectonics and Crustal Evolution. Pergamon Press. New York.
3. Chorley, R.J., (ed.)Spatial Analysis in Geomorphology, London, Metheun.
4. Chorley, R.J, .S.A. Schum and D.E. Sugden (1985): Geomorphology, London
5. Coats, D.R. (1981. edt.).Geomorphology and Engineering, George Allenand 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. Scheidegner, 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
Uni t – 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
Uni t – 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:

1. 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., Mintenbeck, 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
Uni t – 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** **Paper-**
Subject: Geography	**Course Code: GG.GE07-Ti**	**Course Title: Remote Sensing**

Course Outcomes

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
Uni t – 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 Minneapolies.
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

<table>
<tr><td colspan="2">Programme: Under Graduate in Arts</td><td>Year: IV</td><td>Semester: VII</td></tr>
<tr><td colspan="4">Subject: Geography</td></tr>
<tr><td colspan="2">Course Code: GG.DDPE07</td><td colspan="2">Course Title: Dissertation on Major / Dissertation on Minor / Academic project/Entrepreneurship</td></tr>
<tr><td colspan="4">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</td></tr>
<tr><td>Credits: 06</td><td colspan="3">Max. Marks: 100 (Evaluation by External & Internal Examiner)
Dissertation: 75
Internal Assessment: Viva Voce + Attendance : 25 (20+5)</td></tr>
<tr><td colspan="4">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.</td></tr>
</table>

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
Uni t – 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, Otawa.
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, Washngton.
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, Washngton.
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

M.A./M.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. Katra, 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 ploting 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
16. Mishra, B.B. (2022): The Soils of India. https://www.rawatbooks.com/geography/the-soils-of-india
17. Nye, P.H. and Greene, D.J. (1960): The Soil under Shifting Cultivation Commonwealth Bureau of Soil Science, Technical Communication, No. 51; Harpender, England.
18. Plantes, A.D. (2023): Soil science for regenerative agriculture. Independently published.
19. Raychoudhuri, S.P. (1961): Soils of India, ICAR, New Delhi.
20. Russell, Sir Edward J. (1961): Soil Conditions and Plant Growth, Wiley, New York.
21. Zech, W., Schad, P. and Hintermaier-Erhard, G. (2022): Soils of the World. https://link.springer.com/book/10.1007/978-3-540-30461-6

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
Uni t – 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 known Mc. Millan London.
4. Cheremisinoff, P.N. & A.C. Morresi (1977): Environment Assessment and Impact studies Handbook. An Arbor, Mich: Anarbor Science.
5. Clini, C., Musu, I. and Gullino, Maria L. (2008): Sustainable Development and Environmental Management Experiences and Case Studies. https://link.springer.com/book/10.1007/978-1-4020-6598-9?page=2&oscar-books=true
6. Das, M.C. (2019): Concepts of Environmental Management for Sustainable Development. Dreamtech Press.
7. Dehalwar, K. (2015): Basics of Environment Sustainability and Environmental Impact Assessment. Edupedia Publications Pvt Ltd https://books.pen2print.org/index.php?route=product/product&product_id=239
8. Fulekar, M.H., Pathak, B. and Kale, R.K. (Eds) (2013): Environment and Sustainable Development Hardcover. Springer Nature.
9. Murali Krishna, I.V. and Manickam, V. (2017): Environmental Management Science and Engineering for Industry 1st Edition. Butterworth-Heinemann. https://shop.elsevier.com/books/environmental-management/krishna/978-0-12-811989-1
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): Enviromental 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 Blijj, 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., & Fahrer, 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. Pearcy, 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., & Waever, 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 Lowa.
2. Duxbury C.A. and Duxbury B. (1996) An Introduction to the World's Oceans. C. Brown Lowa 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

<table>
<tr><td colspan="2">Programme: Under Graduate in Arts/Science</td><td>Year: IV</td><td>Semester: VIII</td></tr>
<tr><td colspan="4">Subject: Geography</td></tr>
<tr><td colspan="2">Course Code: GG.DDPE08</td><td colspan="2">Course Title: Dissertation on Major / Dissertation on Minor / Academic project/Entrepreneurship</td></tr>
<tr><td colspan="4">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</td></tr>
<tr><td>Credits: 06</td><td colspan="3">Max. Marks: 100 (Evaluation by External & Internal Examiner)
Dissertation: 75
Internal Assessment: Viva Voce + Attendance: 25 (20+5)</td></tr>
<tr><td colspan="4">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.</td></tr>
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DEPARTMENT OF GEOGRAPHY
(Semester IX & X)

Sem.	Core Discipline Specific Course (DSC) 4	DSC/GE 4		Total Credit
IX	DSC9 (3+1=4) **GG.DSC09-T:** **Theory (3)** **Regional Geography of India** **GG.DSC09-P:** **Practical (1)** **Field Survey and Report Writing**	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.DSE09-Ti:** **DSE(3) Natural Resource Management** **GG.DSE09-Pi:** **Pract.(1): RS and GIS Application** **GG.DSE09-Tii:** **DSE(3) -Fluvial Geomorphology** **GG.DSE09-Pii:** **Pract. (1): Drainage Basin Morphometry** **GG.DSE09-Tiii:** **DSE(3) - Population Geography** **GG.DSE09-Piii:** **Pract. (1): Population Data Analysis** **GG.GE09-Ti:** **GE- Cultural Geography** **GG.DSE09-Tii:** **GE- Geography of Uttarakhand**	Dissertation on Major (6) OR Dissertation on Minor (6) OR Academic project/ Entrepreneurship (6)	
	4	**12**	**6**	**22**
X	DSC10 (3+1=4) **GG.DSC10-T:** **Theory (3) Hydrology** **GG.DSC10-P:** **Practical (1) Hydrological Data Analysis**	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.DSE10-Ti:** **DSE(3) - Glacial and Periglacial Geomorphology** **GG.DSE10-Pi:** **Pract. (1):Landform identification and mapping** **GG.DSE10-Tii:** **DSE (3) -Integrated Watershed Management** **GG.DSE10-Pii:** **Practical (1): Watershed Management** **GG.DSE10-Tiii:** **DSE(3) -Agricultural Geography and Agro-Ecosystem Management** **GG.DSE10-Piii:** **Pract. (1): Agricultural Statistics** **GG.GE10-Ti:** **GE - Conceptual Foundations & Perspectives of Sustainable Development** **GG.GE10-Tii:** **GE- Disaster Management**	Dissertation on Major (6) OR Dissertation on Minor (6) OR Academic project/ Entrepreneurship (6)	
	4	**12**	**6**	**22**
				Total 220

DEPARTMENT OF GEOGRAPHY

M.A./M.Sc. Geography

DISCIPLINE SPECIFIC COURSE (DSC) – Regional Geography of India

Programme: Post Graduate in Arts/Science	**Year: V**	**Semester: IX Paper**	
Subject: Geography	**Course Code: GG.DSC09-T**		**Course Title: Regional Geography of India**

Course Outcome

Developed the art of regionalization technique while focusing about diversity of Indian region.

Visualized and recognized about regional identities and socio-cultural dimension of regionalization to address the issues and concern needed for regional planning.

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	Regions in Geography: Process and Concept: Introduction of Regional Geography; Concept of geographical region and regionalization; Nature and scope of regional geography and regional methods of analysis; regional concept and regional geography: Bases of regionalization; previous consideration in Indian Regionalization;	14
Unit – II	Planning and development Approach: Regional development and planning in India, Regional disparities, Five-year plans, NITI Ayog, Integrated rural development programme, Panchayati raj, Command area and watershed management.	16
Unit – III	Schemes of Regionalization in India The Regionalization of India on the basis of population potential of cities; Cultural regions of India; Climate region of India; Geographical regions based on dominant natural vegetation, Soil regions; Structural regions and Physiographic divisions and their sub divisions of India; Agro- climate and its sub regions in India	15
Practical Credit: 1 **GG.DSC09-P**	**Field Survey and Report Writing**	30

Suggested Readings

1. Ahmed, A. (1992). Social geography of India. Rawat Publications.
2. Bagchi-Sen, S., & Smith, H. L. (2006). Economic geography: Past, present and future. Taylor & Francis. (Contains Indian examples.)
3. Bhat, L. S. (1972). Regional planning in India. Statistical Publishing Society.
4. Das, P. (2020). The geography of India. McGraw-Hill India.
5. Dubey, R. N. (2001). Regional development and planning in India. Rajat Publications.
6. Gopalakrishnan, R. (1988). Regional planning in India. Vikas Publishing House.
7. Hussain, M. (2008). Geography of India. Tata McGraw Hill.
8. Jain, S. P. (2005). Development planning for rural development in India. Pointer Publishers.
9. Khullar, D. R. (2011). India: A comprehensive geography. Kalyani Publishers.
10. Mishra, R. P. (2021). Regional development and planning: New strategies for India. Concept Publishing Company.
11. Nag, P. (1992). Geography of India. Concept Publishing Company.
12. Rana, L. (2018). Regional geography of India. Axis Books Pvt. Ltd.
13. Rao, B. P. (2012). Regional planning and development. Sonali Publications.
14. Raza, M., & Aggarwal, Y. (1985). Transport geography of India. Concept Publishing.
15. Raza, M., Ed. (1981). Valley of Kashmir: Regional geography and resource survey. Vikas Publishing.
16. Sharma, R. C. (2006). Regional disparities in India. Anmol Publications.
17. Sharma, T. C. (2003). Economic and commercial geography of India. Vikas Publishing House.
18. Siddhartha, K., & Mukherjee, S. (2001). Cities, urbanization and urban systems. Kisalaya Publications.
19. Singh, J. (2017). Regional planning and development of India. Radha Publications.
20. Singh, R. L. (1971). India: A regional geography. National Geographical Society of India.
21. Singh, R. L. (Ed.). (1971). India: A regional geography. National Geographical Society of India, Varanasi.
22. Singh, S. (2010). Environmental geography. Prayag Pustak Bhawan.
23. Spate, O. H. K., & Learmonth, A. T. A. (1967). India and Pakistan: A general and regional geography (3rd ed.). Methuen & Co. Ltd.
24. Tirtha, R. (2002). Geography of India: Comprehensive, systematic and up-to-date. Rawat

DEPARTMENT OF GEOGRAPHY
B.A./B.Sc.
DISCIPLINE SPECIFIC CORE COURSE (DSE) - Natural Resource Management

Program: Under Graduate in Arts/Science	**Year: V**	**Semester: IX Paper-**
Subject: Geography		
Course Code: GG.DSE09-Ti	**Course Title: Natural Resource Management**	

Course Outcomes

This course helps to gain a comprehensive understanding of the concepts and methodologies involved in natural resource management, including the examination of resource utilization and potential misuse. Additionally, to develop proficiency in analyzing the status of natural resources utilizing various techniques, particularly remote sensing and GIS.

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	Basic Framework: Concept, Definition, Classification of natural resources, Process of resource development.	14
Unit – II	Ecology and Ecosystem: Meaning, Scope, Types and classification of ecology, functioning of ecosystem, energy and nutrients in ecosystem, productivity of ecosystem Trophic levels, food chain, food web, ecological pyramids, bio-geochemical cycles, Significance of ecosystem approach in natural resource studies.	15
Unit – III	Management of Natural Resources: Concept and Approaches of natural resource management, People's participation and shared decision making in natural resource management, Gender issue and livelihood issues in natural resource management; Sustainable Resource Development; Community Based Natural Resource Management.	16
Practical (Credit-1) **GG.DSE09-Pi**	Statistical Analysis: Correlation- Carl Pearson correlation & Spearman's rank correlation. Linear regression analysis & Factor Analysis; Steps of Hypothesis testing. Tests of statistical significance: T-test, Ftest, Chi-Square test, Analysis of Variance.	30

Suggested Readings:

1. Hartshorn, T.A. & Alexander, J.W. Economic Geography, 3rd edn., 1994
2. Boesch, Hans A Geography of World Economy

3. Fryer, D.W. World Economic Development
4. Gregor, H.F. Environment and Economic Life: An Economic and Social Geography
5. Highsmith, R.M.(Jr.) Case Studies in World Geography
6. Hoffman, L.A. Economic Geography
7. Zimmerman, E.W. World Resources and Industries, Harper and Row, London,1951
8. Stringer, A. Davis A Geography of Resources
9. Zones and Darkenwold Economic Geography
10. Mccarty & Lindberg An Introduction to Economic Geography
11. Miller, E.W. A Geography of Manufacturing
12. Whate, C.L. & Criffin, P.E., Economic Geography
13. Russel, J. World Population and Food Supplies
14. Hoover, E.M. The location of Economic Activity
15. Isard, W. Location and Space Economy
16. Stuart Mudd The Population Crisis and the Use of the World Resources
17. Russel Smith Industrial and Commercial Geography
18. Janaki, V.A. Economic Geography
19. Guy, Harold Smith Conserving Natural Resources: Principles & Practice
20. Kates, W. & FireyW,(ed) Man, Mind and Land: A Theory of Resource Use
21. Zimmerman, E.W. Introduction to World Resources
22. Singh, K.N. & Singh,J. Arthik Bhoogol Ke Mool Tatwa (in Hindi)
23. Smith,R.L. Man and his Environment: An Ecosystem Approach, Harper and Row, London, 1972
24. Strahler, A. Geography and Man's Environment, John Wiley, New York,1977
25. Singh, J. Sansadhan Bhoogol, Radha Publications, New Delhi (Hindi), 2006
26. Taylor, Russel D., and Torquebiau, Emmanuel (Eds.). Natural Resource Management and Local Development, Springer, Netherland.,2011.
27. Thakur, B. Company, Perspectives in Resource Management in Developing Countries, Vol.1-13, Concept Publishing New Delhi. 2003-2018

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

Programme: Post Graduate in Arts/Science	**Year: V**	**Semester: IX Paper**	
Subject: Geography	**Course Code: GG.DSE09-Tii**		**Course Title: Fluvial Geomorphology**

Course Outcomes

1. Ability to describe and analyze the hydrological processes shaping fluvial environments, including drainage pattern evolution and channel changes over time.
2. Competence in applying principles of river mechanics to understand flow types, sediment transport, and channel morphology.
3. Proficiency in interpreting hydraulic geometry data to assess stream characteristics and channel patterns.
4. Understanding of the role of drainage basins in landscape evolution and the interrelations between morphometric parameters.
5. Capability to apply fluvial geomorphological knowledge to real-world scenarios, such as human adjustments to floodplains, alluvial fans, and deltaic environments, and assess the impacts of reservoirs using remote sensing and GIS techniques.

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	Fluvial Geomorphology and Geography; hydrological cycle and sub cycle; drainage pattern evolution; limits of drainage development; channel changes with time.	14
Unit – II	Fundamentals of river mechanics: - types of flow and flow discrimination; forces acting in channels; Low regimes; sediment load of streams. sediment transport; competent velocity; lift force; critical tractive force	16
Unit – III	Hydraulic geometry of streams at a station and down-stream; channel thalweg; causes of concavity; channel patterns, equilibrium profile - straight, meandering and braided.	15
Practical Credit: 1 **GG.DSE09-Pii**	**Course Title: Drainage Basin Morphometry**: Hack's Stream Gradient Index, Calculation of Velocity and Discharge, Mapping of Landscape Materials: Zingg's Shape Analysis	30

Suggested Readings

1. Ahmad, E. (2009). Geomorphology. Rajesh Publications.
2. Anderson, M. G., & Burt, T. P. (1990). Process studies in hillslope hydrology. Wiley.
3. Charlton, R. (2007). Fundamentals of fluvial geomorphology. Routledge.
4. Chorley, R. J., Schumm, S. A., & Sugden, D. E. (1984). Geomorphology. Methuen.

5. Church, M. (2006). Rivers and streams: Forms and processes. Wiley.
6. Dutta, S. (2016). Fluvial processes and landforms of the Indian subcontinent. Research India Publications.
7. Gomez, B., & Church, M. (1989). Catchment experiments in fluvial geomorphology. Wiley.
8. Goudie, A. (2013). Arid and semi-arid geomorphology. Cambridge University Press. (Important for dryland fluvial studies.)
9. Kale, V. S. (2020). Fluvial geomorphology: A perspective from the tropics. Springer.
10. Kale, V. S., & Gupta, A. (2001). Introduction to geomorphology. Orient Longman.
11. Kale, V. S., & Sinha, R. (2022). Fluvial systems and river dynamics in India. Springer.
12. Knighton, D. (1998). Fluvial forms and processes: A new perspective. Arnold Publishers.
13. Lane, E. W. (1955). Design of stable channels. Transactions of the American Society of Civil Engineers.
14. Leopold, L. B., Wolman, M. G., & Miller, J. P. (1964). Fluvial processes in geomorphology. Dover Publications. (Classic foundational text.)
15. Richards, K. (1982). Rivers: Form and process in alluvial channels. Methuen.
16. Schumm, S. A. (2005). River variability and complexity. Cambridge University Press.
17. Sharma, H. S. (1991). Indian geomorphology. Concept Publishing Company.
18. Sharma, V. K. (1986). Geomorphology. Rawat Publications.
19. Singh, S. (2005). Geomorphology. Prayag Pustak Bhawan.
20. Sinha, R. (2009). The great avulsion of Kosi River. Geomorphology Journal (special issue) — Elsevier.
21. Sinha, R. (Ed.). (2012). Geomorphology of River Systems: Indian case studies. Springer India.
22. Thakur, V. C. (1992). Geomorphology and neotectonics of Himalaya. Geological Society of India.
23. Tooth, S. (2000). Process, form and change in dryland rivers: A review of recent research. Earth-Science Reviews.
24. Valdiya, K. S. (2010). The making of India: Geodynamic evolution. Springer.
25. Wohl, E. (2014). Rivers in the landscape: Science and management. Wiley.

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

DISCIPLINE SPECIFIC CORE COURSE (DSE) Population Geography

Programme: Under Graduate in Arts/Science	**Year: V**	**Semester:** IX **Paper-**
Subject: Geography Course	**Course Code: GG.DSE09-Tiii**	**Course Title:** Population Geography

Course Outcomes

This course introduces the spatial distribution of population with causative factors. It also deals with various theories and concepts related with population. Study of population is an essential component in planning of various human related issues. Students would be able to understand the distribution and dynamics of population distribution and its problems and management.

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, nature and scope; Relationship with other disciplines, demography and population studies; sources of data with particular reference to census of India.	14
Uni t – II	Factors affecting population distribution; Population growth: trends and determinants; spatial dimension of population growth in India.	15
Unit – III	Trends and patterns in fertility and mortality; Theories of fertility; Migration: major international migrations; features of internal migration in India; Theories of population growth– pre-Malthusian views, Malthus' Theory, views of socialist writers, optimum population theory, demographic transition model	16
Practical (Credit-1) **GG.DSE09-Piii**	**Course Title: Population Data Analysis:** Calculations of population density, population growth, and population projection; age - sex pyramid, trend graph showing population growth, and Lorenz curve; Preparation of map of India or Uttarakhand showing population density.	30

Suggested Readings

1. Beaujen- Garnier J (1966) Geography of Population; Longman, London.
2. Bhende Asha A and Kanitkar (2002) Principles of Population Studies, 14th Edition, Himalaya Publishing House, Mumbai.
3. Chandana, R.C. (2002) Geography of Population: Concepts, determination and patterns, Kalyani Publishers, New Delhi.
4. Clarke, J.I. (1992) Population Geography, Second Edition, Pergamon Press, Oxford, England.
5. Dyson, T. 2010. Population and Development: The Demographic Transition, London: Zed Books.
6. Hassan, M.I. (2005) Population Geography, Rawat Publication, Jaipur.

7. May, J.F. 2012. World Population Policies: Their Origin, Evolution, and Impact, Washington DC: Springer.
8. Premi, M.K. (1991) India's Population Heading Towards a Billion, B.R. Publishing, Cooperation, New Delhi.
9. Brettell, C. B., and Hollifield, J.F. (eds.) 2014. Migration Theory: Talking across Disciplines, 3d ed. New York: Routledge.
10. Castles, S., de Haas, H. and Miller, M.J. 2014. The Age of Migration: International Population Movements in the Modern World, 5th ed. New York and London: Guilford.

DEPARTMENT OF GEOGRAPHY
M.A./M.Sc. Geography
Generic Elective (GE)- Cultural Geography

Programme: Post Graduate in Arts		**Year: V**	**Semester: IX Paper-**
Subject: Geography	**Course Code: GG.GE09-Ti**	**Course Title: Cultural Geography**	

Course Outcomes

1. Ability to analyze and interpret cultural landscapes and processes of cultural diffusion, adaptation, and resilience in different geographical contexts.
2. Competence in recognizing and mapping socio-cultural diversity, including ethnic/tribal groups and components of social diversity like religion, caste, and language.
3. Proficiency in understanding the concept of race and its relationship with culture, as well as the distribution of races and cultures globally.
4. Understanding of socio-cultural diversity in India, including regional variations and processes of social change.
5. Capability to apply knowledge of cultural and social geography to analyze and interpret socio-cultural phenomena and trends, both globally and within specific regions like India.

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	Lectures
Unit – I	Basic Concept: Definition, scope, and significance, Evolution and Development, Place of Cultural and Social Geography within Geography; Cultural Region; Cultural Landscape and Environment. Process: Cultural Landscape Evolution; Cultural Diffusion; Adaptation; Acculturation; Assimilation; and Resistance/ Cultural Resilience.	15
Unit – II	Socio-cultural Diversity: Ethnic/tribal Groups and their Spatial Distribution, Components of social diversity; tribes and their distribution; Tribal region; Cultural regions: elements of cultural regionalization: race, caste, dance, music, cuisine, costumes, dialect, language, religion.	15
Unit – III	Races and Culture Concept of race. Basis of racial classification and their physical characteristics. Races of India. Griffith Taylor and C.S. Coon's Theories of distribution of races of mankind in the world. Concept of culture, culture areas and culture regions, Cultural hearths and their diffusion, World Culture Realms	15
Unit – IV	Socio-cultural Diversity Concept of Dialects and ethnicity. Distribution of Religion, Caste, Tribe, Languages in India. Concept of social areas, North-South Socio-Cultural diversity of India, Processes of Social changes: Modernization, Sanskritization and Globalization	15

Suggested Readings

1. Ahmed, A. (1999). Social Geography. Rawat publications, Jaipur.
2. Ali, S. M. (1966). The geography of the Puranas. People's Publishing House.
3. Anderson, J. (2009). Understanding cultural geography: Places and traces. Routledge.
4. Anderson, Jon. (2010). Understanding Cultural Geography Places and Traces. Routledge, London.
5. Anderson, K. Domosh, M., Pile, S. & Thrift, N. (eds.). (2003). Handbook of Cultural Geography.,Sage Publications, London.
6. Anderson, K., Domosh, M., Pile, S., & Thrift, N. (2003). Handbook of cultural geography. SAGE Publications.
7. Bhattacharya, P. (2012). Urban culture and landscape transformation in India. Mittal Publications.
8. Chattopadhyay, R. (2011). Cultural landscapes and heritage in India. Atlantic Publishers.
9. Cloke, P., Crang, P., & Goodwin, M. (Eds.). (2005). Introducing human geographies. Routledge.
10. Cosgrove, D. (1984). Social formation and symbolic landscape. University of Wisconsin Press.
11. Cosgrove, D. E., & Daniels, S. (1988). The iconography of landscape: Essays on the symbolic representation, design and use of past environments. Cambridge University Press.
12. Crang, M. (1998). Cultural geography. Routledge.
13. Deshpande, C. D. (1992). India: A regional interpretation. ICSSR.
14. Duncan, J. S. (1980). The city as text: The politics of landscape interpretation in the Kandyan Kingdom. Cambridge University Press.
15. Duncan, J., & Ley, D. (1993). Place/culture/representation. Routledge.
16. Entrikin, J. N. (1991). The betweenness of place: Towards a geography of modernity. Johns Hopkins University Press.
17. Gautam, A. (2010). Cultural and human geography of India. Sharda Pustak Bhawan.
18. Ghosh, S. (1985). Urbanization and cultural dynamics in India. Inter-India Publications.
19. Gregory, D., & Urry, J. (1985). Social relations and spatial structures. Macmillan.
20. Harvey, D. (1989). The condition of postmodernity: An enquiry into the origins of cultural change. Blackwell.
21. Jackson, P. (1989). Maps of meaning: An introduction to cultural geography. Routledge.
22. Johnston, R. J., Gregory, D., et.al. (eds.). (2005). The Dictionary of Human Geography, Blackwell Publishing.
23. Jones, E. and Eyles, J. (1977). Introduction to Social Geography. Oxford University Press.
24. Knox, P.L. (1975). Social Well –being: A Spatial Perspective. Oxford, London.
25. Massey, D. (1994). Space, Place and Gender. Polity Press, Cambridge.
26. Massey, D. (1994). Space, place, and gender. University of Minnesota Press.
27. Mehta, S. R. (1996). Cultural patterns and economic change: A study of rural India. Rawat Publications.
28. Mishra, V. K. (2015). Folk cultures and rural landscapes in India. New India Publishing.
29. Misra, R. P. (1969). Cultural regions of India. National Geographical Society of India.
30. Mitchell, D. (2000). Cultural geography: A critical introduction. Blackwell.
31. Mitchell, D. (2003). The right to the city: Social justice and the fight for public space. Guilford Press.
32. Mukherjee, A. (1991). Cultural geography of India. Rawat Publications.
33. Panikkar, K.M. (1959). Geographical Factors in Indian History. Bharatiya Vidya Bhavan, Bombay.

34. Raza, M. and Ahmed, A. 1990. An Atlas of Tribal India. Concept Publishing Co, Delhi.
35. Robertson, R. (1992). Globalization: Social theory and global culture. SAGE.
36. Sauer, C. O. (1952). Agricultural origins and dispersals. American Geographical Society.
37. Sharma, J. P. (2008). Cultural geography: Concepts and issues. Rawat Publications.
38. Sharma, R. C. (2013). Culture, space, and globalization: Indian realities. Concept Publishing Company.
39. Singh, K. N. (1993). Culture and environment: The Indian perspective. Rawat Publications.
40. Singh, K. S. (1993). People of India: An introduction. Anthropological Survey of India.
41. Singh, K.S. (1993). People of India Vol I to XI. Oxford University Press, New Delhi.
42. Singh, R. B. (2009). Urban development and environmental change: Perspectives from Indian experience. Rawat Publications.
43. Singh, R. B. (2014). Climate change and cultural sustainability: Indian perspectives. Springer.
44. Singh, R. L. (1955). Elements of cultural geography. Nand Kishore and Bros.
45. Smith, N. (1984). Uneven development: Nature, capital, and the production of space. Blackwell.
46. Sopher, D. (ed.). (1980). An Exploration of India: Geographical Perspectives on Society and Culture . Cornell Press, New York.
47. Subba Rao, B. (1958). Personality of India. MS University Press, Baroda.
48. Tiwari, R. C. (2016). Cultural and settlement geography of India. New Academic Publishing.
49. Tuan, Y. F. (1977). Space and place: The perspective of experience. University of Minnesota Press.
50. Vincent J. Del Casino, (2009). Social Geography- Critical Introduction to Geography. Wiley-Blackwell.
51. Yadava, S. (2000). Rural-urban migration and cultural change in India. Concept Publishing.

DEPARTMENT OF GEOGRAPHY

M.A./M.Sc. Geography

Generic Elective (GE)- Geography of Uttarakhand

Programme: Post Graduate in Arts/Science	**Year: V**	**Semester: IX Paper-**
Subject: Geography Course Code: GG.DSE09-Tii		**Course Title: Geography of Uttarakhand**

Course Outcomes

1. Ability to assess environmental characteristics and their implications.
2. Competence in analyzing population dynamics and cultural diversity.
3. Proficiency in understanding agricultural trends and resource management.
4. Understanding of mineral resource exploitation and industrial development.
5. Capability to evaluate economic potentials and develop sustainable plans for the region.

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	Physical Background: Geo-environmental background: Geology, Physiography, Climate, Drainage, Soils, flora and fauna, Natural and Bio-geographic Regions.	10
Uni t – II	Population and Settlements: Population and Human Resource Development; Spatial Patterns, Structure, Composition and Dynamics of Population; Tribal Groups and their Spatial Distribution, Fairs Festivals and Languages and Dialects, Settlements: Types and Patterns	15
Unit – III	Agricultural Development: Agricultural Characteristics and Trends; land holdings; Land Reforms; Cropping Pattern; Irrigation; Farm Technology; Agricultural Productivity and Agricultural Regions; Impact of Green Revolution; Horticultural and Floriculture Development including medicinal, aromatic plants and Organic farming.	15
Unit – IV	Mineral and Energy Resources and Industries: Major Mineral Deposits: Distribution and Production, Energy Resources: Development of Hydro- electricity, Industries: Localization and Spatial Distribution, Principal Industries of the region, Industrial Regions, Trade, Transport, Tourism and forestry, Potentials and Prospects; Future Prospects and Development Plans: Prospects of Tourism, Sustainable Development Plan for Uttarakhand Himalaya, Environmental Hazards and Management in Uttarakhand Himalaya.	20

Suggested Reading

1. Badoni, P.D. (2004). Economic Geography of Uttarakhand. New Delhi: Concept Publishing Company.
2. Bahuguna, V. (2002). Natural disasters and mitigation in Uttarakhand. Indian Publishers Distributors.
3. Bhatt, S.C. (2004). Uttarakhand: Ecology and environment. Anmol Publications.
4. Bisht, B.S. (2017). Political Geography of Uttarakhand. New Delhi: Rawat Publications.
5. Bisht, Himani. (2025). Sustainable Geography Practices in Uttarakhand. New Delhi: Rawat Publications.
6. Bose, S.C. (1968). Land and People of the Himalaya, Calcutta.
7. Dhyani, P.P. (2005). Climate change and the Himalayan ecosystem. G. B. Pant Institute of Himalayan Environment.
8. Dobhal, Rajendra. (2012). Urban Geography of Uttarakhand. New Delhi: Mittal Publications.
9. Joshi, B.K. (2001). Uttarakhand: Ecology and Environment. New Delhi: Gyan Publishing House.
10. Joshi, D.C. (2013). Natural Hazards and Geography of Uttarakhand. New Delhi: Scientific Publishers.
11. Joshi, D.D. (1983). Uttaranchal: Past, present, and future. Himalayan Publications.
12. Joshi, Kamal. (2024). Biodiversity and Geography of Uttarakhand. New Delhi: Rawat Publications.
13. Joshi, P. C. (2002). Urbanization in Himalayan region: Issues and challenges. Rawat Publications.
14. Joshi, Rajesh. (2023). Glacial Geography of Uttarakhand. New Delhi: Indus Publishing Company.
15. Joshi, S.C. (2001). Uttaranchal: Environment & Development, 2001
16. Joshi, S.C. et.al. (1983). Kumaun Himalaya, Nainital, 1983.
17. Kala, C. P. (2004). Ecology and conservation of Himalayan forests. Gyan Books.
18. Khanna, D.R. (2022). Agricultural Geography of Uttarakhand. New Delhi: Scientific Publishers.
19. Kishor, Nand. (2015). Tourism Geography of Uttarakhand. New Delhi: Concept Publishing Company.
20. Kuniyal, J.C. (2015). Geomorphology of Uttarakhand. New Delhi: Scientific Publishers.
21. Maikhuri, R.K. (2014). Himalayan Geography: Focus on Uttarakhand. New Delhi: Indus Publishing Company.
22. Nautiyal, Arvind. (2018). Hydrology and Geography of Uttarakhand. New Delhi: Scientific Publishers.
23. Nautiyal, Asha. (2022). Uttarakhand: Geography and Environment. New Delhi: Gyan Publishing House.
24. Nautiyal, P. (2013). Uttarakhand: Dynamics of development. Kalpaz Publications.
25. Nautiyal, Pankaj. (2018). Regional Geography of Uttarakhand. Jaipur: Rawat Publications.
26. Nautiyal, S.P. (2005). Physical Geography of Uttarakhand Himalaya. New Delhi: Mittal Publications.
27. Negi, H.S. (2008). Geographical Perspectives of Uttarakhand. New Delhi: Scientific Publishers.
28. Negi, J. S. (1984). Geography of Uttar Pradesh and Uttarakhand. National Book Trust.
29. Negi, Jyoti. (2023). Watershed Geography of Uttarakhand. New Delhi: New India Publishing Agency.
30. Negi, M.S. (2002). Geography of Uttarakhand. New Delhi: Concept Publishing Company.
31. Negi, S. S. (1995). Uttarakhand: Land and people. M.D. Publications.
32. Negi, S.S. (2020). Changing Landscapes of Uttarakhand. New Delhi: Indus Publishing Company.
33. Pandey, A.K. (2021). Forest Geography of Uttarakhand. New Delhi: Concept Publishing Company.

34. Pandey, D.D. (2010). Climate Change and Geography of Uttarakhand. New Delhi: Concept Publishing Company.
35. Pandey, Savita. (2025). Socio-Economic Geography of Uttarakhand. New Delhi: Indus Publishing Company.
36. Pant B. R. Pant (2010). Tribal Demography of India, Anamika Publication, New Delhi 288p.
37. Pant B. R. Pant (2021). Demographic Study of the Indian Himalayan Region, Ankit Prakashan Haldwani.
38. Pant B. R., R. Chand and B. S. Mehta (2022) उत्तराखंड: जनसँख्या परिदृश्य एवं परिवर्तन, पहाड़ नैनीताल ।
39. Pant, Anjali. (2016). Development and Geography in Uttarakhand. New Delhi: Mittal Publications.
40. Pant, Mohan. (2022). Population Geography of Uttarakhand. New Delhi: Rawat Publications.
41. Pant, R. K. (2010). Population dynamics in Himalayan region: A case study of Uttarakhand. Shree Almora Book Depot.
42. Panwar, Virendra. (2019). Mountain Geography of Uttarakhand. New Delhi: Concept Publishing Company.
43. Pathak, S. (1997). Tourism, environment, and ecology of the Garhwal Himalaya. Pointer Publishers.
44. Rawat, A. S. (1999). Forest management in Kumaon Himalaya. Indus Publishing.
45. Rawat, G.S. (2006). Environmental Geography of Uttarakhand. Jaipur: Rawat Publications.
46. Rawat, J.S. (2007). Spatial Patterns in Uttarakhand. New Delhi: Indus Publishing Company.
47. Rawat, M. S. (2012). Tourism in Uttarakhand: Problems and prospects. Mohit Publications.
48. Rawat, M.K. (2011). Uttarakhand: A Geographical Study. New Delhi: Rawat Publications.
49. Rawat, Meenakshi. (2021). Disaster Geography of Uttarakhand. New Delhi: Mittal Publications.
50. Rawat, Neha. (2019). Geographical Information Systems (GIS) Applications in Uttarakhand. New Delhi: New India Publishing Agency.
51. Rawat, Poonam. (2014). Cultural Geography of Uttarakhand. Jaipur: Rawat Publications.
52. Rawat, S.L. (2023). River Systems and Geography of Uttarakhand. New Delhi: Concept Publishing Company.
53. Sah, D. C. (2001). Migration in the mountains: Study of Uttarakhand. Rawat Publications.
54. Semwal, D. P. (2006). Resource management and development in the Himalaya. Shree Almora Book Depot.
55. Sharma, Sangeeta. (2013). Rural Geography of Uttarakhand. New Delhi: Gyan Publishing House.
56. Sharma, V.K. (2021). Uttarakhand Himalaya: Geographical Analysis. New Delhi: Scientific Publishers.
57. Singh, J. (1995). Mountain geomorphology and sustainable development in Himalaya. Mittal Publications.
58. Singh, Praveen. (2024). Geography of Natural Resources in Uttarakhand. New Delhi: Scientific Publishers.
59. Singh, R. B., & Haigh, M. (1995). Sustainable reconstruction of Highland and Headwater Regions: The Himalayan experience. Oxford & IBH Publishing.
60. Singh, R.B. (2016). Environmental Hazards in Uttarakhand. New Delhi: National Book Trust (NBT).
61. Singh, S.K. (2020). Ecological Geography of Uttarakhand. Jaipur: Rawat Publications.
62. Tolia, R.S. (2003). Resource Geography of Uttarakhand. New Delhi: Indus Publishing Company.
63. Valdiya, K. S. (1980). Geology of the Kumaun Lesser Himalaya. Wadia Institute of Himalayan Geology.
64. Valdiya, K. S. (1993). High dams in the Himalaya: Environmental concerns. Konark Publishers.

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

<table>
<tr><td colspan="2">Programme: Under Graduate in Arts</td><td>Year: V</td><td>Semester: IX</td></tr>
<tr><td colspan="4">Subject: Geography</td></tr>
<tr><td colspan="2">Course Code: GG.DDPE09</td><td colspan="2">Course Title: Dissertation on Major / Dissertation on Minor / Academic project/Entrepreneurship</td></tr>
<tr><td colspan="4">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</td></tr>
<tr><td>Credits: 06</td><td colspan="3">Max. Marks: 100 (Evaluation by External & Internal Examiner)
Dissertation: 75
Internal Assessment: Viva Voce + Attendance : 25 (20+5)</td></tr>
<tr><td colspan="4">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.</td></tr>
</table>

DEPARTMENT OF GEOGRAPHY

M.A./M.Sc.

DISCIPLINE SPECIFIC COURSE (DSC) – HYDROLOGY

Programme: Post Graduate in Arts/Science	**Year: V**	**Semester: X : Paper**
Subject: Geography	**Course Code: GG.DSC10-T**	**Course Title: Hydrology**

Course Outcomes

1. Ability to assess and interpret the components of the hydrological cycle and their interactions.
2. Competence in analyzing the properties and dynamics of the underground hydrosphere.
3. Proficiency in understanding the characteristics of drainage basins and their human impacts.
4. Understanding of flow measurement techniques, hydrograph analysis, and surface water quality assessment.
5. Capability to apply principles of water balance and remote sensing in hydrological analysis and water management, including estimating discharge, runoff volume, and rainfall-runoff relationships.

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	Conceptual Base**:** Concepts and scope of hydrology, Elements of hydrological cycle: precipitation - intensity and duration; evaporation; infiltration, surface runoff, Man's interference on hydrological cycle	13
Unit – II	Underground Hydrosphere: Hydrological properties of rocks. Structure of the underground hydrosphere - Vadose and phreatic Zones, Types of aquifers, Underground water classification, Recharge and discharge of ground water; Ground Water Movements and Drainage Basin Characteristics Hydraulic conductivity, Darcy's law, Porosity, Permeability, Transmissibility, Drainage basin characteristics: human impact on hydrological system, morphometric analysis	16
Unit – III	Flow Measurements and Hydrograph: Channel flow measurement, Hydrograph analysis; Water quality, Surface water resources of India. Application of Remote Sensing and Water Management: Principles of water balance and their application - its relevance in crop geography; water pollution, need for water management; Application of remote sensing in hydrological studies.	16
Practical Credit (01) **GG.DSC10-P**	**Course Title: Hydrological Data Analysis**: Water Balance Graph; Estimation of discharge, runoff volume and rainfall runoff relationship; Estimation of average depth of rainfall using (a) Arithmetic Mean Method, (b) Thiessen Polygon Method, and (c) Isohyetal Method; Drawing of unit hydrograph and interpretation.	30

Suggested Readings

1. Agarwal, A. & Narain, S. (2000). Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting Systems. New Delhi: Centre for Science and Environment.
2. Arora, K.R. (2010). Irrigation, Water Power and Water Resources Engineering (4th ed.). New Delhi: Standard Publishers Distributors.
3. Balek, J. (2002). Hydrology and Water Resources in Tropical Regions. London: CRC Press.
4. Best, J. (2022). Sedimentology and Hydrology of Fluvial Systems. Cambridge: Cambridge University Press.
5. Beven, K. (2012). Rainfall-Runoff Modelling: The Primer (2nd ed.). Chichester: Wiley-Blackwell.
6. Bhattacharya, A.K. (2007). Urban Hydrology. New Delhi: New Age International Publishers.
7. Black, P.E. (2017). Watershed Hydrology (2nd ed.). New York: CRC Press.
8. Brutsaert, W. (2005). Hydrology: An Introduction. Cambridge: Cambridge University Press.
9. Chorley, R.J. (ed.) (1969): Water Earth and Man, Methuen, London.
10. Chow, V.T., Maidment, D.R., & Mays, L.W. (2010). Applied Hydrology (2nd ed.). New York: McGraw-Hill.
11. Dakshinamurthy, et.al. (1973): Water, Resources of India and Their Utilization in Agriculture, IARI, New Delhi.
12. Das, P. (2004). Hydrology and Soil Conservation Engineering. New Delhi: Prentice Hall of India.
13. David Knighton (1984): Fluvial Forms and Processes, Edward Arnold, London
14. Dingman, S.L. (2002). Physical Hydrology (2nd ed.). Upper Saddle River: Prentice Hall.
15. Garg, S.K. (2012). Irrigation Engineering and Hydraulic Structures (28th ed.). New Delhi: Khanna Publishers.
16. Goudie, A. (2013). The Human Impact on the Natural Environment: Past, Present, and Future (7th ed.). Oxford: Wiley-Blackwell.
17. Govt. of India, Ministry of Energy and Irrigation (Dept. of Irrigation, 91980), Rashtriya Barh Ayog, Report- National Commission on Floods, Vol. I & II.
18. Goyal, M.R. (2014). Principles and Management of Clogging in Micro Irrigation. New Hampshire: Apple Academic Press.
19. Gregory, K.J. and Walling De (1973): Drainage Basin Form and Processes,Edward Arnold, London.
20. Gupta, R.D. (2003). Hydrology and Watershed Management. New Delhi: Atlantic Publishers.
21. Haan, C.T. (2002). Statistical Methods in Hydrology (2nd ed.). Ames: Iowa State Press.
22. Hannah, D.M., et al. (2011). Large-Scale Hydrology. Chichester: Wiley-Blackwell.
23. Jackson, P.J. (1977): Climate, Water and Agriculture in the Tropics, London.
24. Jain, S.K., Agarwal, P.K., & Singh, V.P. (2007). Hydrology and Water Resources of India. Dordrecht: Springer.
25. Jha, Madan Kumar (2010). Natural and Anthropogenic Disasters: Vulnerability, Preparedness and Mitigation. New Delhi: Capital Publishing Company.

26. Jones, J.A.A (1997): Global Hydrology: Processes, Resources and Environmental Management, Longman, London.
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35. Pande, C.B. (2012). Watershed Hydrology and Management. Jaipur: Rawat Publications.
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39. Singh, R.A. and Singh, S.R. (1972): Water Management: Principles and Practices. Tara Publication, Varanasi.
40. Singh, V.P. (2007). Hydrologic Modeling: Progress and Future Directions. Dordrecht: Springer.
41. Singh, V.P., & Frevert, D.K. (2002). Mathematical Models of Small Watershed Hydrology and Applications. Littleton: Water Resources Publications.
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43. Sposito, G. (2008). The Chemistry of Soils and Waters. New York: Oxford University Press.
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DEPARTMENT OF GEOGRAPHY

M.A./M.Sc. Geography

DISCIPLINE SPECIFIC ELECTIVE (DSE) – Glacial and Periglacial Geomorphology

Programme: Post Graduate in Arts/Science	**Year: V**	**Semester: X**	**Paper:**
Subject: Geography			
Course Code: GG.DSE10-Ti		**Course Title: Glacial and Periglacial Geomorphology**	

Course Outcomes

1. Describe Pleistocene glaciation and its effects on landscapes.
2. Recognize erosional landforms like cirques and U-shaped valleys.
3. Identify depositional features such as moraines and eskers.
4. Understand periglacial phenomena and their impact on landscapes.
5. Apply remote sensing for identifying and mapping glacial landforms.

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	Theoretical Base: Definition of Glacial Geomorphology; Ice Age; Causes of ice ages; Pleistocene Glaciation; onset and retreat.	14
Unit – II	Erosional Processes and Landforms: Erosional process; glacial erosion, development of erosional landforms; supraglacial, englacial and basal; Depositional Processes and Landforms: Depositional processes: processes-stratified and non-stratified; forms of Moraines; glaciofluvial and glacio-lacustrine environment.	16
Unit – III	Periglacial Processes: Periglacial process: frozen ground phenomenon – identifical, depth variations, classification and distribution; mechanism of frost action. Periglacial Landforms and Human adaptation: Periglacial landforms; frost action and landforms-mass wasting and landforms, adaptation of human beings to periglacial environment.	16
Practical Credit (01) **GG.DSE10-Pi**	**Course Title: Landforms identification and Mapping**: Erosional and Depositional Landforms Identification in satellite imagery/ Google earth image and Mapping, Identification of periglacial/ permafrost landforms with the help of satellite imagery/ Google earth image. Glacial Geomorphological Mapping.	30

Suggested Readings

1. Bali, R. (2010). Landforms and Evolution of Glaciated Landscapes in the Central Himalaya. New Delhi: Rawat Publications.
2. Benn, D.I., & Evans, D.J.A. (2010). Glaciers and Glaciation (2nd ed.). London: Hodder Education.
3. Benn, D.I., & Lehmkuhl, F. (2000). Mass Balance and Glacier Fluctuations in High Asia. Heidelberg: Springer.
4. Bøe, A.G. (2022). Introduction to Permafrost Geomorphology. Cambridge: Cambridge University Press.
5. Brown, R.J.E. (1970). Permafrost in Canada. University of Toronto Press, Toronto.
6. Carson MA. and Kirkby M.J., (1972). Hillslope Form and Process, Cambridge University Press.
7. Coates, D.R.(ed.), (1974). Glacial Geomorphology, State University of New York.
8. Cogley, J.G. (2011). Mass Balance of Glaciers and Ice Sheets. Cambridge: Cambridge University Press.
9. Dixon, J.C. and Abrahams, A.D. (eds.), (1992). Periglacial Geomorphology. John Wiley, New York.
10. Drewry, D. (1986). Glacial Geological Processes, Edward Arnold, London.
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12. Embleton, C. and King, C.A.M., (1968). Glacial and Periglacial Geomorphology, Edward Arnold, London.
13. Embleton, C. and Thormes, J. (eds.) (1980). Process in Geopmorphology, Arnold - Hesnemann, New Delhi.
14. Evans, D.J.A. (2009). Glacial Landsystems. London: Hodder Education.
15. Fabel, D., & Harbor, J. (2021). Glacial Geomorphology: Processes and Forms. New York: Routledge.
16. Fagan, B. (2009). The Great Warming: Climate Change and the Rise and Fall of Civilizations. New York: Bloomsbury Press.
17. French, H.M. (2017). The Periglacial Environment (4th ed.). Chichester: Wiley-Blackwell.
18. Haeberli, W., & Whiteman, C. (2014). Snow and Ice-Related Hazards, Risks, and Disasters. Amsterdam: Elsevier.
19. Hails, J.R. (ed.) (1977). Applied Geomorphology Elsevier Sci. Amsterdam.
20. Hambrey, M.J. (2004). Glacial Environments. Vancouver: UBC Press.
21. Ives, J.D., & Messerli, B. (2004). Himalayan Perceptions: Environmental Change and the Well-Being of Mountain Peoples. London: Routledge.
22. Jha, Madan Kumar (2010). Natural and Anthropogenic Disasters: Vulnerability, Preparedness and Mitigation. New Delhi: Capital Publishing Company.
23. Kale, V.S. (2010). Glaciation and Fluvial Geomorphology in the Himalayas. New Delhi: Allied Publishers.
24. Knight, J., & Harrison, S. (2014). Periglacial and Paraglacial Processes and Environments. London: Geological Society Special Publications.
25. Knight, P.G. (2000). Glacier Science and Environmental Change. Oxford: Blackwell Publishing.
26. Kuhle, M. (2013). Glacial and Periglacial Forms of the Tibetan Plateau. Berlin: Springer.
27. Kumar, A. (2014). Glacial Geomorphology of Garhwal Himalaya. New Delhi: Concept Publishing Company.

28. Leigh, D.S. (2020). Fluvial and Glacial Landscapes. Chichester: Wiley.
29. Matsuoka, N. (2015). Frost Weathering and Periglacial Processes. Cambridge: Cambridge University Press.
30. Mool, P.K. (2001). Glacial Lakes and Glacial Lake Outburst Floods in Nepal. Kathmandu: ICIMOD.
31. Negi, S.S. (2006). Geography of Glaciers. New Delhi: Indus Publishing Company.
32. Owen, L.A. (2017). An Introduction to Global Glaciations. Cambridge: Cambridge University Press.
33. Pandey, P. (2016). Himalayan Glaciers: A Geomorphological Perspective. New Delhi: Scientific Publishers.
34. Pelto, M. (2015). Glaciers: The Politics of Ice. Corvallis: Oregon State University Press.
35. Peterson, D.L., & Buckingham, S.E. (2008). Mountain Weather and Climate. Cambridge: Cambridge University Press.
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37. Pewe, T.L.(ed.) (1969). The Periglacial Environment. Mc. Gill- Queen's University Press, Montreal.
38. Price, L.W. (1972). The Periglacial Environment, Permafrost and Man., Commission on College Geography, Resourc Paper No. 14, Washington, D.C.
39. Raina, V.K. (2010). Himalayan Glaciers: A State-of-Art Review of Glacial Studies, Glacial Retreat, and Climate Change. New Delhi: Ministry of Environment and Forests, Govt. of India.
40. Ritter, D.F. Craig, R. and Miller, J.P. (1995). Process of Geomorphology. W.C. Brown Dubuque.
41. Sharma, M.C. (2019). Glaciers and Glacier Lakes of Uttarakhand. Dehradun: Uttarakhand Science Education and Research Centre.
42. Shroder, J.F. (2012). Himalaya: Mountains of Life. New Delhi: Ashoka Trust for Research in Ecology and the Environment.
43. Singh, P., & Jain, S.K. (2002). Snow and Glacier Hydrology. Dordrecht: Springer.
44. Singh, R.B., & Singh, R.L. (2005). Fluvial and Glacial Geomorphology of the Himalaya. New Delhi: New India Publishing Agency.
45. Singh, S. (2012). Geomorphology of the Himalaya. New Delhi: Rawat Publications.
46. Sugden, D.E. and John, B.S. (1976). Glaciers and Landscape. Edward Arnold, London.
47. Vander Veen, C.J., (1999). Fundamentals of Glacier Dynamics., A.A. Balkemma, Rotterdam.
48. Wright, A.E and Mosley, P.(eds) (1975). Ice Ages: Ancient and Modern., Seel House Press, Liverpool.
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DEPARTMENT OF GEOGRAPHY
M.A./M.Sc.
DISCIPLINE SPECIFIC ELECTIVE (DSE) – Integrated Watershed Management

Program: Post Graduate in Arts/Science	**Year: III**	**Semester: VI Paper-**
Subject: Geography	**Course Code: GG.DSE10-Tii**	**Course Title: Integrated Watershed Management**

Course Outcomes

1. Ability to apply watershed management approaches to assess and address environmental challenges within a watershed context.
2. Competence in analyzing ecosystem components and energy dynamics within watersheds, and their implications for natural resource management.
3. Proficiency in evaluating the environmental health status of watersheds and identifying potential hazards and impacts.
4. Understanding of the functioning of ecosystems within watersheds, including the effects of human activities on ecosystem processes.
5. Capability to implement watershed management techniques and methods, develop sustainable management plans, and utilize remote sensing applications for monitoring and assessment purposes.

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	Conceptual Base: Concept, Scope and Significance: Approaches of Watershed Management; Ecosystem and Energy Environment: Land Use Pattern, Natural Resource appraisal and Development, Ecological Processes and Ecosystem: Agro-Ecosystem, forest Ecosystem, River Ecosystem and Hydrological Cycle; Energy Analysis and Energy Budget of the Watershed.	14
Unit – II	Environmental Status and Hazards: Environmental Health Status: Physical properties (Viz, Temperature, Rainfall, Soil etc.) and Human Habitat of the and Anthropogenic Interferences on the Status and Watershed; Impact of Environmental Quality of the Watershed; Major Natural Hazards: Landslides, Erosion, Floods, Droughts, Sedimentation, Disruption of Hydrological Cycle etc.	15
Unit – III	Functioning of Ecosystem: Impact of Agriculture, Mining and Quarrying, Deforestation, Livestock, Frequent Construction of Roads on Ecosystems Functioning of Watershed with particular reference to Uttarakhand Himalaya; Environmental Impact Assessment (EIA); Watershed Management: Watershed Management: Techniques and Methods, Land and Soil Conservation, Run-off Control, Sustainable Environment Management Plan for Local Resources. Remote Sensing Application in Watershed Management.	16
Practical Credit: 01 **GG.DSE10-Pii**	**Course Title: Watershed Management:** Watershed Delineation, Rainfall Distribution , Runoff Estimation, Land and Water Resource Appraisal: Demand and Supply	30

Suggested Readings

1. Agarwal, A., & Narain, S. (1997). Dying wisdom: Rise, fall and potential of India's traditional water harvesting systems. Centre for Science and Environment.
2. Bhattacharya, A. K. (2008). Soil conservation and watershed management. Concept Publishing Company.
3. Bhattacharya, A. K. (2010). Integrated watershed management: Field manual. McGraw Hill India.
4. Brooks, K. N., Ffolliott, P. F., & Magner, J. A. (2012). Hydrology and the management of watersheds (4th ed.). Wiley-Blackwell.
5. Calder, I. R. (2005). Blue revolution: Integrated land and water resource management (2nd ed.). Earthscan.
6. Dubey, D. P. (2005). Watershed management. Dominant Publishers.
7. Falkenmark, M., & Rockström, J. (2004). Balancing water for humans and nature: The new approach in ecohydrology. Earthscan.
8. Garg, S. K. (2008). Irrigation engineering and hydraulic structures. Khanna Publishers.
9. Heathcote, I. W. (2002). Integrated watershed management: Principles and practice (2nd ed.). Wiley.
10. Jha, M. K. (2010). Natural and anthropogenic disasters: Vulnerability, preparedness and mitigation. Springer India.
11. Kurothe, R. S., et al. (2014). Watershed development in India: Economic and policy issues. NIAP.
12. Lal, R. (1990). Soil erosion in the tropics: Principles and management. McGraw-Hill.
13. Ministry of Rural Development, Government of India. (2008). Common guidelines for watershed development projects.
14. Molden, D. (Ed.). (2007). Water for food, water for life: A comprehensive assessment of water management in agriculture. Earthscan/IWMI.
15. Molle, F., & Wester, P. (Eds.). (2009). River basin trajectories: Societies, environments and development. CABI.
16. Morgan, R. P. C. (2005). Soil erosion and conservation (3rd ed.). Blackwell Publishing.
17. Postel, S. (1999). Pillar of sand: Can the irrigation miracle last? W. W. Norton & Company.
18. Prasad, R. N. (2010). Watershed management and sustainable development. Mittal Publications.
19. Rao, K. V. G. K. (1993). Watershed management for sustainable agriculture. Indian Council of Agricultural Research.
20. Reddy, V. R., & Syme, G. J. (2015). Integrated assessment of scale impacts of watershed intervention: Assessing hydrogeological and livelihood impacts in semi-arid India. Elsevier.
21. Saxena, K. G. (2001). Integrated natural resource management: Approaches and lessons from Indian experience. ICIMOD.
22. Sen, R. (2015). Sustainable watershed management: Challenges and solutions. Springer.
23. Sharma, A. (2017). Watershed management: Concepts and case studies. New India Publishing Agency.
24. Sharma, H. S. (1998). Perspectives in resource management in developing countries (Vol. 1). Concept Publishing Company.
25. Sharma, R. K., & Sharma, T. K. (2008). Irrigation engineering. S. Chand & Company.
26. Sikka, A. K., & Samra, J. S. (2005). Watershed management research in India: Strategies and experiences. ICAR.
27. Singh, G., Bandyopadhyay, B. K., & Chattopadhyay, S. (2000). Watershed management. ICAR, New Delhi.
28. Singh, R. B. (2009). Management of water resources: Sustainable practices. Concept Publishing.
29. Singh, S. (2000). Integrated watershed management in India: Policies and practices. MD Publications.
30. Sinha, S. K. (2006). Watershed management and water harvesting. Pointer Publishers.
31. Suresh, R. (2012). Soil and water conservation engineering. Standard Publishers.
32. Tideman, E. M. (1996). Watershed management: Guidelines for Indian conditions. Omega Scientific Publishers.
33. Verma, H. N. (2013). Integrated watershed management for sustainable agriculture. New India Publishing Agency.

DEPARTMENT OF GEOGRAPHY

M.A./M.Sc.

DISCIPLINE SPECIFIC ELECTIVE (DSE) – AGRICULTURAL GEOGRAPHY AND AGRO-ECOSYSTEM MANAGEMENT

Programme:Post Graduate in Arts/Science	**Year: V**	**Semester: X**	**Paper:**
Subject: Geography			
Course Code: GG.DSE10-Tiii	**Course Title: Agricultural Geography and Agro- Ecosystem Management**		

Course Outcomes

1. Define Agricultural Geography and apply study approaches to understand agricultural dynamics.
2. Recognize global agricultural types, aiding in understanding their spatial distribution.
3. Proficiently use quantitative techniques for assessing agricultural parameters and regional patterns.
4. Understand agro-ecosystem dynamics and degradation, particularly in mountainous areas.
5. Analyze agricultural statistics and contribute to regional planning for sustainable agricultural development.

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	Concepts: Definition, Nature, scope, Significance of Agricultural Geography, Approaches to the study Agricultural Geography, Agricultural Land Use and Location Theories; Agricultural Types: Agricultural types and their world distribution, Subsistence Agriculture, Commercial farming, Plantation agriculture, Mixed agriculture, State, Collective and Cooperative farming, Spatial patterns of major commodities in each type.	14
Unit – II	Techniques of Agricultural Regionalization: Quantitative Techniques and methods in Agricultural Geography for measuring Agricultural Intensity, Agricultural Efficiency, Concentration and Diversification of Crops, Methods of delimitation of crop Combination and Agricultural regions. Whittlesey's classification of Agricultural regions of the world.	15
Unit – III	Agricultural Ecology and Ecosystem: Agro-ecosystem – connotation, components, types and functioning, agroecosystem degradation with special reference to Himalaya, Agro-ecosystem and agro-energy environment Management. Planning and Management: Regional Perspective: Problems of agriculture and agricultural planning in India, salient features of agricultural development of Uttarakhand Himalaya and their management and planning.	16
Practical Credit (01) **GG.DSE10-Piii**	**Course Title: Agricultural Statistics** – Index of area under crop, index of net area sown, index of cropping pattern, index of yield, and index of productivity; Agricultural land use mapping.	30

Suggested Readings

1. Bhalla, G.S. and Alagh, Y.K. (1979) performance of India, agriculture: a district wise study, sterling, New Delhi.
2. Das, M.M. (1982). Peasant Agriculture in Assam, Inter India, New Delhi.
3. Gobind, N. (1986). Regional perspective in agriculture, concept, New Delhi.
4. Hussain, M. (1979). Agricultural Geography, Inter India, New Delhi.
5. Mergra, W.B. & Munton, R.J.C. (1971). Agricultural Geography, methuen, London.
6. Mitchel, P. (1979). Agro-ecosystem, Inter India Publication,New Delhi
7. Shafi, M. (1984). Agricultural Productivity and Regional Imbalance, Concept, New Delhi.
8. Singh J. & Dhillon, S.S. (1985). Agricultural Geography, Tata McGraw Hill, New Delhi.
9. Singh, J. (1974). Agricultural Atlas of India: A Geographical perspective,Vishal Publications, Kurukshetra.
10. Wathern, Peter (1986). Enviromental Impact Assessment: Theory and Practice.Unwin & Hyman, London. 1986.
11. Brundland, G. (1988). Our Common Future, Report of the World Commission on Environment and Development, UN.
12. Grigg, D. (2003). An Introduction to Agricultural Geography (2nd ed.). London: Routledge.
13. Singh, Jasbir. (2000). Agricultural Geography. New Delhi: Tata McGraw-Hill.
14. Barlowe, Raleigh. (2001). Land Resource Economics (4th ed.). New Delhi: Prentice Hall India.
15. Pretty, Jules. (2002). Agroecology: The Science of Sustainable Agriculture (2nd ed.). London: Earthscan.
16. Singh, R.L. (2003). Fundamentals of Agricultural Geography. Varanasi: Shivalal Agarwala & Co.
17. Gliessman, S.R. (2007). Agroecology: The Ecology of Sustainable Food Systems (2nd ed.). Boca Raton: CRC Press.
18. Thakur, B. (2002). Agricultural Geography. Patna: Vasundhara Prakashan.
19. Altieri, Miguel A. (2012). Agroecology: Principles and Strategies for Sustainable Agriculture. New York: CRC Press.
20. Misra, R.P. (2005). Agricultural Geography and Food Security. New Delhi: Concept Publishing Company.
21. Pretty, Jules. (2008). Sustainable Agriculture and Food. London: Earthscan.
22. Bhalla, G.S., & Singh, G. (2010). Economic Liberalisation and Indian Agriculture. New Delhi: Sage Publications India.
23. Gliessman, S.R. (2014). Agroecology: The Ecology of Sustainable Food Systems (3rd ed.). Boca Raton: CRC Press.
24. Brookfield, Harold. (2001). Exploring Agrodiversity. New York: Columbia University Press.
25. Gautam, N.C. (2006). Advanced Survey Techniques in Agricultural Geography. New Delhi: Concept Publishing.
26. Altieri, M.A., & Nicholls, C.I. (2017). Agroecology: A Global Movement for Food Security and Sovereignty. Boca Raton: CRC Press.
27. Pender, John. (2001). Development Pathways for Sustainable Agriculture in Sub-Saharan Africa and South Asia. Washington D.C.: IFPRI.

28. Rao, P.P., Birthal, P.S., & Joshi, P.K. (2006). Diversification Towards High-Value Agriculture. New Delhi: National Centre for Agricultural Economics and Policy Research (NCAP).
29. Ghatak, Subrata. (2001). Agriculture and Economic Development. London: Macmillan.
30. Deb, D. (2009). Beyond Developmentality: Constructing Inclusive Freedom and Sustainability. New Delhi: Earthscan.
31. Gliessman, S.R. (2021). Transforming Food Systems with Agroecology. Boca Raton: CRC Press.
32. Singh, R.B., & Haigh, M.J. (2004). Sustainable Agriculture and Rural Development in India. New Delhi: Rawat Publications.
33. Altieri, Miguel A. (2018). Agroecology and the Design of Climate-Resilient Farming Systems. New York: CRC Press.
34. Reddy, G.P., & Reddy, V.R. (2005). Agricultural Diversification in India. New Delhi: Mittal Publications.
35. Fan, Shenggen, & Chan-Kang, Connie. (2005). Road Development, Economic Growth, and Poverty Reduction in China. Washington D.C.: IFPRI.
36. Shiva, Vandana. (2016). Agroecology and Regenerative Agriculture: Sustainable Solutions for Hunger and Climate Change. New Delhi: Natraj Publishers.
37. Uphoff, Norman. (2002). Agroecological Innovations: Increasing Food Production with Participatory Development. London: Earthscan.
38. Borras, Saturnino M. (2007). Pro-Poor Land Reform: A Critique. Ottawa: University of Ottawa Press.
39. Saha, S.K. (2012). Agroforestry Systems and Practices. New Delhi: New India Publishing Agency.
40. Joshi, P.K., Gulati, A., & Cummings, R. (2007). Agricultural Diversification and Smallholders in South Asia. New Delhi: Academic Foundation.
41. Singh, Katar. (2010). Rural Development: Principles, Policies and Management (3rd ed.). New Delhi: Sage Publications India.
42. Pretty, Jules. (2020). Agroecology Now! Transformations Towards More Just and Sustainable Food Systems. London: Routledge.
43. Babu, Suresh Chandra, & Blom, Sarah. (2014). Building Resilience for Food and Nutrition Security. Washington D.C.: IFPRI.
44. Tripathi, R.S. (2015). Indian Agriculture: An Analysis of Rural Economy and Agro-environment. New Delhi: Regal Publications.
45. Tittonell, Pablo. (2022). Agroecology for Sustainable Food Systems. Amsterdam: Elsevier.
46. Sharma, V.P. (2018). Indian Agriculture: Performance, Growth and Challenges. New Delhi: Springer India.

DEPARTMENT OF GEOGRAPHY
M.A./M.Sc. Geography
Generic Elective (GE) - Conceptual Foundations & Perspectives of Sustainable Development

Programme: Post Graduate in Arts/Science	**Year: V**	**Semester: X Paper-**
Subject: Geography Course	**Course Code: GG.GE10-Ti**	**Course Title: Conceptual Foundations & Perspectives of Sustainable Development**

Course Outcomes
Foundation on the concept of sustainable development and to gain an empirical understanding of the emerging global challenges for sustainable environmental and societal governance systems.

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	**Topics**	Lectures
Unit - I	Introduction to Sustainable Development: Glimpse into History and Current practices - Broad introduction to SD - its importance, need, impact and implications; definition coined; evolution of SD perspectives (MDGs AND SDGs) over the years; recent debates; 1987 Brundtland Commission and outcome; later UN summits (Rio summit, etc.) and outcome.	12
Unit- II	Ecosystem & Sustainability: Fundamentals of ecology - types of ecosystems & interrelationships, factors influencing sustainability of ecosystems, ecosystem restoration - developmental needs. Introduction to sustainability & its factors, requirements for sustainability: food security and agriculture, renewable resources - water and energy, non-renewable resources, factors and trade-offs, sustainability conflicts, a conceptual framework for linking sustainability and sustainable development.	12
Unit – III	Dimensions to Sustainable Development - society, environment, culture and economy; current challenges - natural, political, socio-economic imbalance; sustainable development initiatives and policies of various countries: global, regional, national, local; needs of present and future generation - political, economic, environmental.	12
Unit - IV	Frameworks of Sustainability - Analytical frameworks in sustainability studies, sustainability metrics: criteria and indicators; the significance of quantitative and qualitative assessments of sustainability; current metrics and limitations; metrics for mapping and measuring sustainable development; application of the metrics in real scenarios.	12

Suggested Reading:

1. Adams, William M. (2009). Green Development: Environment and Sustainability in a Developing World (3rd Ed.). Routledge.
2. Anand, Sudhir (2022). Inequality and Sustainability. Oxford University Press.
3. Banerjee, Subhabrata Bobby (2007). Corporate Social Responsibility: The Good, the Bad and the Ugly. Edward Elgar Publishing.
4. Baviskar, Amita (2005). In the Belly of the River: Tribal Conflicts over Development in the Narmada Valley (Revised Ed.). Oxford University Press India.
5. Beckerman, Wilfred (2002). A Poverty of Reason: Sustainable Development and Economic Growth. Independent Institute.
6. Bell, Simon, and Stephen Morse. Sustainability indicators: measuring the immeasurable?. Routledge, 2012.
7. Bina, Olivia (2013). The Future of Sustainability. Springer.
8. Chambers, Robert & Conway, Gordon (2011). Sustainable Rural Livelihoods: Practical Concepts for the 21st Century (Reprint). Institute of Development Studies (IDS).
9. Chambers, Robert (2005). Ideas for Development. Earthscan/Routledge.
10. Dent, David, Olivier Dubois, and Barry Dalal-Clayton. Rural planning in developing countries: supporting natural resource management and sustainable livelihoods. Routledge, 2013.
11. Elliott, Jennifer. 2012. An Introduction to Sustainable Development. 4th Ed. Routledge, London.
12. Escobar, Arturo (2011). Encountering Development: The Making and Unmaking of the Third World (New Edition). Princeton University Press.
13. Escobar, Arturo (2018). Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds. Duke University Press.
14. Franco, I.B. and Tracey, J. (2019), "Community capacity-building for sustainable development: Effectively striving towards achieving local community sustainability targets", International Journal of Sustainability in Higher Education, Vol. 20 No. 4, pp. 691-725
15. Gadgil, Madhav & Guha, Ramachandra (2008). Ecology and Equity: The Use and Abuse of Nature in Contemporary India. Routledge India.
16. Gasparatos, Alexandros, and Anna Scolobig. "Choosing the most appropriate sustainability assessment tool." Ecological Economics 80, no. 0 (2012): 1-7.
17. Goodland, Robert (2002). Sustainability: Human, Social, Economic and Environmental. World Bank Publications.
18. Guha, Ramachandra (2014). Environmentalism: A Global History (Updated Edition). Penguin India.
19. Gupta, Joyeeta (2023). Our Earth Matters: Pathways to a Better Common Future. Cambridge University Press.
20. Kates, Robert W., Parris, Thomas M., & Leiserowitz, Anthony A. (2005). What is Sustainable Development? Goals, Indicators, Values, and Practice. Environment: Science and Policy for Sustainable Development (Publication).
21. Kerr, Julie. Introduction to energy and climate: Developing a sustainable environment. CRC Press, 2017.
22. Kothari, Ashish (Ed.) (2017). Alternative Futures: India Unshackled. AuthorsUpFront.

23. Kothari, Ashish, Demaria, Federico & Acosta, Alberto (Eds.) (2020). Pluriverse: A Post-Development Dictionary. Tulika Books/AuthorsUpFront.
24. Lele, Sharachchandra (2018). Sustainability: A Critical Perspective. Routledge India.
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44. Streimikis, Justas, and Tomas Baležentis. "Agricultural sustainability assessment framework integrating sustainable development goals and interlinked priorities of environmental, climate and agriculture policies." Sustainable Development 28, no. 6 (2020): 1702-1712.
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DEPARTMENT OF GEOGRAPHY

M.A./M.Sc.

GENERIC ELECTIVE (GE) – DISASTER MANAGEMENT

Programme: Post Graduate in Arts/Science	**Year: V**	**Semester: X Paper-**
Subject: Geography Course	**Course Code: GG.GE10-Tii**	**Course Title: Disaster Management**

Course Outcomes

1. Ability to assess the significance of disasters and their implications for communities and society.
2. Proficiency in understanding national disaster management policies and requirements.
3. Capability to implement long-term measures like prevention, mitigation, and preparedness.
4. Competence in applying disaster legislation and utilizing resources for effective disaster management.
5. Understanding of response mechanisms and post-impact factors such as recovery, relief, and rehabilitation, and their roles in disaster management.

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	Fundamentals of Disaster Management: The significance of disaster, Disaster threat, National disaster management policy, Major requirements for coping with disaster, Disaster and disaster management cycle,	13
Uni t – II	Long term Measures: Prevention, Mitigation, Preparedness, Disaster and development, Disaster legislature, Counter disaster resources, Disaster management plans, Utilization of resources.	14
Unit – III	Response to Disaster Impact: Response; Search, Rescue and Evacuation, Logistic; Incident command system.	13
Unit – IV	Major Post impact Factors: Recovery, Post disaster review and damage assessment, Relief, Rehabilitation and Restructuring; Regional Pattern of Disaster Management: International disaster assistance, Leadership in disaster, Organization, Disaster scenario of Uttarakhand, Disaster management system in Uttarakhand.	20

Suggested Readings:

1. Alexander, David. (2002). Principles of Emergency Planning and Management. Oxford University Press.
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3. Bhattacharya, S. (2012). Geoinformatics for Disaster Risk Reduction. CRC Press.
4. Blaikie, P., Cannon, T., Davis, I., & Wisner, B. (1994). At Risk: Natural Hazards, People's Vulnerability and Disasters. Routledge.
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7. Coppola, Damon P. (2010). Communicating Emergency Preparedness: Strategies for Creating a Disaster Resilient Public. CRC Press.
8. Diacu, Florin. (2010). Megadisasters: The Science of Predicting the Next Catastrophe. Princeton University Press.
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10. Ghosh, S.T. (2013). Disaster Vulnerability, Hazards and Resilience: Perspectives from India. Rawat Publications.
11. Gupta, Harsh K. (2003). Disaster Management. Universities Press.
12. Hyndman, Donald & Hyndman, David. (2006). Natural Hazards and Disasters. Cengage Learning.
13. Kataria, S.K. (2020). Disaster Management: Future Challenges and Opportunities. Kataria Publications.
14. Kumar, Mukesh. (2021). Emergencies and Disaster Management. Sage Publications India.
15. Mathur, M.C. (2006). Earthquake Disasters and Mitigation. B.S. Publications.
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22. Posner, Richard. (2004). Catastrophe: Risk and Response. Oxford University Press.
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24. Shaw, Rajib. (2010). Urban Disaster Management. Elsevier.
25. Shrivastava, A.K. (2012). Climate Change and Disaster Management. APH Publishing.
26. Singh, R.B. (2000). Environmental Hazards: Assessment and Mitigation. Rawat Publications.

27. Srivastava, S. (2005). Natural Disasters: A Guide for Relief Workers. National Institute of Public Administration (NIPA).
28. Sylves, Richard. (2015). Disaster Policy and Politics: Emergency Management and Homeland Security. CQ Press.
29. United Nations ISDR. (2004). Living with Risk: A Global Review of Disaster Reduction Initiatives. UN Publications.
30. Wallace, Michael & Webber, Lawrence. (2004). The Disaster Recovery Handbook. AMACOM.
31. किशोर, कमल. (2018). जलवायु परिवर्तन और आपदा प्रबंधन. अटलांटिक पब्लिशर्स (Atlantic Publishers).
32. कुमार, अशोक (2015). आपदा विज्ञान. शारदा पुस्तक भवन (Sharda Pustak Bhawan).
33. कुमार, सुरेश (2022). आपदा: एक सामाजिक अध्ययन. अनामिका पब्लिशर्स (Anamika Publishers).
34. कौल, वसंत (2009). आपदा प्रबंधन. ओरिएंट ब्लैकस्वान (Orient BlackSwan).
35. चंद्र, रमेश (2016). आपदाएं और विकास. विश्वविद्यालय प्रकाशन (Vishwavidyalaya Prakashan).
36. मिश्र, हरिशंकर (2015). आपदा प्रबंधन एवं सुरक्षा. पॉइंटर पब्लिशर्स (Pointer Publishers).
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38. मिश्रा, के.सी (2019). आपदा प्रबंधन: सिद्धांत और व्यवहार. राजकमल प्रकाशन (Rajkamal Prakashan).
39. रंजन, राजीव (2011). आपदा प्रबंधन और भारतीय संदर्भ. यूनिवर्सिटी साइंस प्रेस (University Science Press).
40. शर्मा, डी.एन (2017). प्राकृतिक आपदाएँ और प्रबंधन. प्रवालिका पब्लिकेशंस (Pravalika Publications).

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

<table>
<tr><td colspan="2">Programme: Under Graduate in Arts</td><td>Year: V</td><td>Semester: X</td></tr>
<tr><td colspan="4">Subject: Geography</td></tr>
<tr><td colspan="2">Course Code:GG.DDPE10</td><td colspan="2">Course Title: Dissertation on Major / Dissertation on Minor / Academic project/Entrepreneurship</td></tr>
<tr><td colspan="4">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</td></tr>
<tr><td>Credits: 06</td><td colspan="3">Max. Marks: 100 (Evaluation by External & Internal Examiner)
Dissertation: 75
Internal Assessment: Viva Voce + Attendance : 25 (20+5)</td></tr>
<tr><td colspan="4">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.</td></tr>
</table>