



**NEP Syllabus
For
Four-Year B.A. /B.Sc. (Hons.) in Geography
(with Research)**

**Effective from 2024-2025
Academic Session**

**Department of Geography
(Faculty of Sciences)
Jamia Millia Islamia (A Central
University)
New Delhi- 110025, India**



Department of Geography Faculty of
Sciences

Course Structure (Undergraduate Programme) 2024-25

Sem.	Major Core (DSC)	Minor Generic Elective (GE)	Multi-disciplinary	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Value Addition Course (VAC)	Summer Internship *	Research Project/ Dissertation	Total Credits
I	DSC 1 Geomorphology Credit 4 DSC 2 Climatology & Oceanography Credit 4	DSE World Geography Credit 4	SWAYAM Credit 2	----	Understanding Maps Credit 3	Environmental Geography Credit 2	----- -		20
II	DSC 3 Human Geography Credit 4 DSC 4 Geography of India Credit 4	DSE Population Geography Credit 4	SWAYAM Credit 2	-----	Statistical Techniques in Geography Credit 3	Digital Empowerment Credit 2	----- -		24

DSC= Discipline Specific Core, GE =Generic elective (It is a pool of courses meant to provide multidisciplinary or interdisciplinary education to students), DSE = Discipline Specific Elective

*Summer Internship: If the student wishes to re-enter the degree programme, he/she will have to undertake summer internship (Credit 4)

UG Certificate (Exit-1) = 40 +4

Sem.	Major Core (DSC)	Minor Generic Elective (GE)	Multidisciplinary	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Value Addition Course (VAC)	Summer Internship *	Research Project/Dissertation	Total Credits
III	DSC5 Hydrology Credit 4	DSE Bio-Geography Credit 4	SWAYAM Credit 3	Interpretation of Socio-economic data Credit 3	-----	Acquisition and Analysis of Climatic Data (VAC) Practical Credit 2			21
	DSC 6 Resource Geography Credit 4								
IV	DSC 7 Economic Geography Credit 4	DSE Contemporary issues in agriculture Credit 4	SWAYAM Credit 2		-----	Introduction to Disaster Management (VAC) Credit 2	-----		20
	DSC 8 Photogrammetry Credit 4								
	DSC 9 Remote Sensing Techniques Credit 4								

* **Summer Internship: If the student wishes to re-enter the degree programme, he/she will have to undertake summer internship (Credit 4)**

UG Diploma (Exit-2) = 81+4

Sem.	Major Core (DSC)	Minor Generic Elective (GE)	Multidisciplinary	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Value Addition Course (VAC)	Summer Internship	Research Project/Dissertation	Total Credits
V	DSC 10 Regional Planning and Development Credit 4 DSC 11 Rural Development Credit 4 DSC 12 Practical: Cartographic methods and Land Surveying Credit 4	DSE Natural and anthropogenic Hazards Credit 4	SWAYAM Credit 2	-----	Image Interpretation Credit 3	-----	-----	-----	19
VI	DSC 13 Geographical Thought Credit 4 DSC 14 GIS and GPS Credit 4 DSC 15 Practical: Geospatial Technologies Credit 4	DSE: Land use Planning Credit 4	SWAYAM Credit 2	-----	Acquisition of Spatial Data Credit 3	-----	02 credits	-----	21

3-Years UG: Major: 60, Minor: 24, Multi-disciplinary: 09, AEC: 09, SEC: 09, VAC: 08, Summer Internship: 02 3-year UG

Degree (Exit-3) = 121

Sem.	Major Core (DSC)	Minor Generic Elective (GE)	Multidisciplinary	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Value Addition Course (VAC)	Summer Internship	Research Project/Dissertation (Students who secure 75% Marks are entitled to take Dissertation. However, if the students do not wish to undertake Dissertation, they have to opt three courses of 12 credits)	Total Credits
VII	DSC 16 Introduction to Geopolitics Credit 4 DSC 17 Urban Geography Credit 4 DSC 18 Disaster Risk Reduction Credit 4 DSC 19 Sustainable Development Credit 4	DSE: Principles of Ecology Credit 4	-----	-----	-----	-----	-----	-----	20
VIII	DSC 20 Application of RS/GIS/GPS Credit 4 DSC 22 Soil and water resource management DSC 23 Urban environmental management DSC 24 Health and well-being 4 Credits (4x3=12)	DSE: Energy and Climate Change Credit 4	-----	-----	-----	-----	-----	Dissertation on Major 12 credits OR Three courses on Major	20

4 Year UG Degree (Honours) (Exit-4) with three Papers on Major = 162
Major: 80, Minor: 32, Multi-disciplinary: 09, AEC: 09, SEC: 09, VAC: 08, Summer Internship: 02

4 Year UG Degree with Research (Exit-4) (With 75% or above marks in the first six semesters and those students who have opted for Dissertation) = 167

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*First Semester*)

Course Name: Geomorphology
Course Code: 24GEOC101
Total Marks: 100

Course Type: Core Course
Credits: 4

GEOMORPHOLOGY

UNIT – I

Nature and Scope of Geomorphology; Geological Time Scale; Origin of the Continents and Oceans: Wegner's theory; Plate tectonics and Earth surface configuration; Interior of the Earth.

Unit - II

Major Landforms: Mountains, Plateaus, plains: their classification and distribution; Earth's Materials: Rocks-their origin, classification and characteristics.

Unit - III

Earth Movements: Endogenetic Processes: Epeirogenetic and Orogenetic - Folds and Faults; Earthquakes: Classification and world distribution; Volcanic activity: causes, types, distribution and resultant landforms.

Unit - IV

Geomorphic agents and processes: Exogenetic Processes, Denudational agents Weathering Process: Physical, Chemical and Biological; Fluvial, Aeolian, Karst, Coastal and Glacial landforms; Cycle of Erosion: Davis and Penck

Suggested Readings:

1. Dayal, P., 2015: Text-Book of Geomorphology, Shukla Book Depot, Patna.
2. Gabler R.E, Peterson. J.F., Trapasso, L.M. 2009. Essentials of Physical Geography Brooks/ Cole Cengage Learning.
3. Kale, V. and Gupta, A., 2004. Elements of Geomorphology. Oxford University press, Calcutta.
4. Strahaler, A.H., 2013 (6th edition). Introducing Physical Geography. Wiley Pub.
5. Thornbury, W.D., 1991. Principles of Geomorphology, Wiley Eastern Ltd., New Delhi
6. Worcester, P.C. 1969. Text Book of Geomorphology. East West Press, New Delhi.
7. Savindra Singh. Fundamental Concepts in Geomorphology. Prayag Pustak Bhavan, Allahabad.
8. Gautam, A. 2015. Geomorphology. Sharda Pustak Bhawan.
9. Hugget, R.J. 2011. Fundamentals of Geomorphology. Routledge Pub.
10. Harvey, 2012. A. Introducing Geomorphology: A Guide to Landforms and Processes. Dunedin Academic Press.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*First Semester*)

Course Name: Climatology and Oceanography
Course Code: 24GEOC102
Total Marks: 100

Course Type: Core Course
Credits: 4

CLIMATOLOGY AND OCEANOGRAPHY

Unit I Weather and Climate

Introduction to climatology, Weather and climate: elements and controlling factors; Atmosphere: Composition and Structure, Heat budget of the atmosphere and earth; Pressure belts; Winds: Planetary, Periodic and Local.

Unit II Atmospheric Circulations

Humidity, Evaporation and Condensation; Tropical and Temperate Cyclones, Anti-cyclones, Air Masses and Fronts; EL-NINO, La Nina and Southern Oscillation.

Unit III Introduction to Oceanography

Relief features of ocean basins; Submarine relief features of Atlantic, Pacific and Indian Oceans; Distribution of Temperature and Salinity; Ocean currents and Tides; Origin of coral reefs: types and coral bleaching

Unit IV Contemporary Trends in Climatology and Oceanography

Climate change, Global warming, Greenhouse gases, Adaptation to climate change, sustainable marine resources management and Blue economy; Coastal hazard management; Application of remote sensing and GIS in Oceanography.

Books Recommended:

1. Barry, R.G. and Chorley R.J. 2009 (9th edition). Atmosphere Weather and climate, Routledge
2. Critchfield, J.H. 1983 (4th edition). General Climatology. Phi Learning Pub.
3. Das, P.K. 2011(3rd edition). The Monsoons. National Book Trust, New Delhi
4. Fein, J.S. and Stephens, P.N. 1987. Monsoon. John Wiley and Sons, New York
5. India Met. Deptt: Climatological Tables of observation in India
6. Lal, D.S. 2012. Climatology. Sharda Pustak Bhawan, Allahabad.
7. Lydolph, P.E. 1985. The Climate of the Earth. Roman & Allanheld Pub.
8. Menon, P.A. 1989. Our Weather, National Book Trust, New Delhi.
9. Thompson, R.D. and Perry, A. 1997. Applied Climatology: Principles and Practice. Routledge.
10. Andrew D. Ward and Stanley Trimble 2004 (2nd edition). Environmental Hydrology,
11. Garg, S.K. 2005. Hydrology and Water Resource. Khanna Publishers, New Delhi.
12. Garrison Tom. 2012. Geography: An Invitation to Marine Science. Brooks/Cole. New York
13. Garrison Tom. 2008. Essentials of Oceanography. Brooks/Cole. New York
14. Savindra Singh. 2013. Oceanography. Prayag Pustak Bhawan, Allahabad.
15. Singh, V.P., 1992. Elementary Hydrology. Prentice Hall Inc., Upper Saddle River,
16. Timothy, Davie, (2003), Fundamentals of Hydrology. Routledge, Taylor and Francis Group, U.K.
17. Hussain, T and Tahir, M. 2012. Oceanography. Jawahar Pub., New Delhi
18. Siddhartha, K. (2013). Oceanography: A Brief Introduction. Kisalaya Pub., New Delhi

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*First Semester*)

Course Name: World Geography
Course Code: 24GEOM101
Total Marks: 100

Course Type: Minor Course
Credits: 4

WORLD GEOGRAPHY

Unit - I: Geography of Asia

Southeast Asia: Physical and Human Overview: Population, Climate and Natural Vegetation, Mineral Resources, Colonial and Modern Economics.

Southwest Asia: Physical and Cultural Overview: Population, Climate and Natural Vegetation, Mineral Resources, Petroleum Economy.

China: Physical and Human Overview: Population, Climate and Natural Vegetation, Mineral Resources, Economy.

Unit - II: Europe

Geographical Location, Landforms, Climate, Resources, Environmental Modifications and Crisis.

History of Development; Population: Demographics, Religion, Languages, Level of Living, Distribution, Urbanization.

Unit - III: U.S. and Canada

Physical Geography, Resources for Industrial Growth, Demographic Characteristics, Population Mobility, Economic Growth and Restructuring.

Unit - IV: Sub-Saharan Africa

Sub-Saharan Africa: Main Regions; Physical and Cultural Diversity, Climate, Colonial Legacy.

Suggested Readings:

1. English, Paul Ward and James, A. Miller: World Regional Geography: A Question of Place, John Wiley, New York, 1989.
2. Jackson, Richard H. and Lloyd, E. Hudman: World Regional Geography: Issues for Today, John Wiley, New York, 1991.
3. Don, R. Hoy (ed.): Essentials of Geography and Development, MacMillan, New York, 1980.
4. Hussain, M. 2008, World Geography, Rawat Publications, Jaipur.
5. Khan, N. and Hoda, M. (2008) A Text Book on General Geography of Asia, Kalyani Publisher, New Delhi.
6. Goh, C.L., Morgan G.C. (1982) Human and Economic Geography, Oxford University Press

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*First Semester*)

Course Name: Understanding Maps
Course Code: 24GEOS101
Total Marks: 75

Course Type: Skill Enhancement Course
Credits: 3

UNDERSTANDING MAPS

Unit - I: Scale and Maps

Scale: Concept, Definition and Significance; Types of the scale: Plain Scale, Comparative Scale, and Diagonal Scale. Concept and Definition of Maps; Historical Evolution of Maps; Elements of Map; Significance and Usage of Maps.

Unit - II: Types of Map

Classification of Maps on the Basis of Scale: Large Scale Maps: Cadastral Map, Topographical Map, Small Scale Maps: Wall Map, Atlas Map, On the Basis of Function: Physical Map: Relief map, Geological Map, Climate Map, Soil Map, Social and Cultural Maps: Population Map, Political Map, Economic Map, Transportation map.

Unit - III: Projections and Techniques

Definition, Properties and Usage: Cylindrical Projection, Conical projection, Zenithal Projection, Mercator Projection. Surveying: Meaning and concept; Role of Remote Sensing and GIS in Modern Map Making.

Suggested Readings:

1. Monkhouse. F. J. and Wilkinson. H. R. 1972, Maps and Diagrams. Methuen, London
2. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publisher
3. Sarkar S, 2015. Practical geography: A Systematic Approach, Orient Blackswan Pvt Ltd
4. Robinson A. H., 2009. Elements of Cartography, John Wiley and Sons, New York.
5. Khan Jabir, Hasan T & Shamshad, 2014, Scales, Academic Publications,
6. Misra, R. P. 1969. Fundamentals of Cartography, Prasaranga. University of Mysore, Mysore.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*First Semester*)

Course Name: Environmental Geography
Course Code: 24GEOV101
Total Marks: 50

Course Type: Value Added Course
Credits: 2

ENVIRONMENTAL GEOGRAPHY

Unit- I: Introduction to Environment

Concept, Definition, and Components; Human and Environment Interaction; Humanization of Nature and Naturalization of Human; Environmental disorders: Human Impact on Land, Climate and Natural vegetation.

Unit – II: Environmental Issues & Global Problems

Climate change, Global warming and Ozone depletion; Local and Regional Problems: Extreme hydrological events; Deforestation and Desertification; Pollution of air and water; Depletion of Freshwater resources and Degradation of Soils.

Suggested Readings:

1. Adams, W.M.1995: Green development: Environmental sustainability in the Third World; London: Routledge.
2. Alexander, D. 1993: Natural Disasters, New Delhi: Research Press.
3. Allaby, M. 1996: Basics of Environmental science, London: Routledge.
4. Baarshes, W.H. 1996: Eco-fiction: Understanding the Environmental Debate, London: Routledge.
5. Brayant, E.A.1991: Natural Hazards, Cambridge: Cambridge University press.
6. Canter,L. W.1996: Environmental Impact Assessment, 2nd edition, New York: McGraw hill.
7. Chapman,D. 1994: Natural Hazards, Melbourne: Oxford University Press.
8. Chapman J.L. and Reiss, M.J. 1993: Ecology: Principles and applications, Cambridge: 10. Cambridge; University Press.
9. Colls, J.1997: Air Pollution: An Introduction, London: Chapman and Hall.
10. Das, R.C. and Behera, B.K. 2008: Environmental Science: Principle and Practice, Prentice Hall of India Pvt. Ltd., Delhi

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*First Semester*)

Course Name: Environmental Issues and Management
Course Code: 24GEOT101
Total Marks: 75

Course Type: Multi-disciplinary
Credits: 3

ENVIRONMENTAL ISSUES AND MANAGEMENT (SWAYAM)

Unit I-Introduction to Environment

Definition, meaning and components; Human and Environment Interaction; Humanization of Nature and Naturalization of Human; Environmental disorders: Human Impact on Land, Climate and Natural vegetation.

Unit-II Environmental Issues Global Problems

Climate change, Global warming and Ozone depletion; Local and Regional Problems: Extreme hydrological events; Deforestation and Desertification; Pollution of air and water; Depletion of Freshwater resources and Degradation of Soils.

Unit - III: Environmental Strategies

Uncertainty in managing environmental problems, Sustainable environmental development; Preservation and conservation; Integrated management and community participation in management.

Books Recommended:

1. Adams, W.M.1995: Green development: Environmental sustainability in the Third World; London: Rout ledge.
2. Alexander, D. 1993: Natural Disasters, New Delhi: Research Press.
3. Allaby, M. 1996: Basics of Environmental science, London: Routledge.
4. Baarrshes, W.H. 1996: Eco-fiction: Understanding the Environmental Debate, London: Routledge.
5. Brayant, E.A.1991: Natural Hazards, Cambridge: Cambridge University press.
6. Canter, L. W.1996: Environmental Impact Assessment, 2nd edition, New York: McGraw hill.
7. Chapman, D. 1994: Natural Hazards, Melbourne: Oxford University Press.
8. Chapman J.L. and Reiss, M.J. 1993: Ecology: Principles and applications, Cambridge: 10. Cambridge; University Press.
9. Colls, J,1997: Air Pollution: An Introduction, London: Chapman and Hall.
10. Das, R.C. and Behera, B.K. 2008: Environmental Science: Principle and Practice, Prentice Hall of India Pvt. Ltd., Delhi

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Second Semester*)

Course Name: Human Geography
Course Code: 24GEOC201
Total Marks: 100

Course Type: Core Course
Credits: 4

HUMAN GEOGRAPHY

Unit - I: Introduction to Human Geography

Definition, nature and scope of human Geography; Branches of human Geography; Dichotomy of physical and human geography; Concepts of man and environment relationship; Environmental Determinism and Possibilism.

Unit - II: Patterns of Population Distribution

Growth and distribution of population in the world; Age-sex structure; Theories of Population growth: Malthus, Demographic transition; Migration: Recent theories, Causes and consequences; Human Development Index.

Unit - III: Human Settlements

Settlement: Size, situation and classification; Origin and evolution of rural settlements; Types and patterns of rural settlement; Origin and growth of urban settlements; Process and pattern of urbanization, classification of cities based on site, size and functions.

Unit - IV: Human Adaptation to Environment

Evolution of man; Man in ecosystem; Ecological adaptation; Human adaptation in equatorial, monsoon, tundra and hot desert; Habitat, Economy and Society of Bakarwals, Tharus, Naga and Bhills.

Suggested Readings:

1. Ahmad, Q.S. (1963): Major Natural Regions, S. Chand Publisher, Delhi.
2. AmitHarichandran, M.A. Chaudhry (2010): Global Vision Publication House, New Delhi-11002.
3. Kaushik, S.D. (1970): ManavBhoogol, Rastogi & Co., Meerut.
4. Hoyt, J.B. (1973): Man and the Earth, Prentice Hall, New Jersey.
5. Husain, Majid (2010): Human Geography, Rawat Publication, Jaipur.
6. Husain, Majid (2010): ManavBhoogol, Rawat Publication, Jaipur.
7. Leong, G. C. (1995): Certificate Physical and Human Geography, Oxford Publication.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Second Semester*)

Course Name: Geography of India
Course Code: 24GEOC202
Total Marks: 100

Course Type: Core Course
Credits: 4

GEOGRAPHY OF INDIA

Unit - I

India as a Geographical Unit; Region: Concept, definition and types; Scheme of Regionalization: O.H.K. Spate and R.L. Singh; Concept of planning region, Watershed as a Planning Region.

Unit - II

Geology and Structure; Physical Divisions of India; Drainage; Climate; Climatic Regions; Soil; Natural Vegetation, Agro-climatic Regions.

Unit – III

Population Growth, Distribution and its factors; Population Composition: Sex ratio, Rural and Urban breakup, Literacy, Work force, Language, Religion, Caste, Old-age population.

Unit - IV

Agricultural: Food crops, Cash crops, Green Revolution, Agriculture through Five-Year Plans; Agricultural Regionalization, Minerals: Production and Distribution of Metallic resources; Energy resources: Conventional and Non-Conventional; Industries: Mineral based and Agro-based; Industrial Regions, Industrial Policy, SEZ, Transport and Communication.

Suggested Readings:

1. Deshpande C.D: Indian-A Regional Interpretation, Northern Book centre, New Delhi.1992.
2. Chauhan.T., 1997: Geography of Rajasthan, Vigyan Prakashan Jodhpur.
3. Farmer. B.H. An Introduction to South Asia, Methuen, London, 1983.
4. Govt. of India-Reference Annual, 2001 Pub.div; New Delhi.
5. Govt. Of India: National Atlas of India Natmo Publication, Calcutta.
6. Hussain.M. 2009,Geography of India, Tata Mc Graw-Hill companies Book.
7. Kalpana Raja Ram, 2007, Geography of India, Spectrum Books, New Delhi 110058.

8. Govt.Of India: The Gazetteer of India. Vol. I & III Publication division.
9. Learmonth A.T.A et.al (ed) Man and land of South Asia, Concept
10. Mitra, A: levels of Regional development of India, Census of India, Vol.I, Part I-A (i) and (ii) New Delhi, 1967.
11. Routray, J.K.: Geography of Regional Disparity, Asian Institute of Technology, Bangkok, 1993.
12. Sdhekhkar.S.(edt.)2004, Regional Planning in India, Anmol Publications, New Delhi-2
13. Shafi, M: Geography of South Asia, McMillan & Co; Calcutta, 2000.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Second Semester*)

Course Name: Population Geography
Course Code: 24GEOM201
Total Marks: 100

Course Type: Minor Course
Credits: 4

POPULATION GEOGRAPHY

Unit-I: Introduction to Population Geography

Subject matter and scope of Population geography, Demography and population Geography; Sources of Population Data: Census, Vital Statistics and National Sample Survey, National Family Health Survey; Approaches in population Geography.

Unit-II: Population Growth and Distribution

Population Growth and change: Trends of Population Growth in the World; World Pattern of population distribution; factors affecting population distribution; Population Dynamics: Fertility, Mortality and Migration, Theories of Population growth: Malthusian theory, Theory of Demographic Transition;

Unit-III: Population Composition

Age and Sex Composition; Rural and Urban Composition; Economic Composition Literacy and Education; Religion/Caste/ Race etc.

Unit-IV: Population Problems and Policies-India

Sex Ratio Imbalance; Gender issues: Ageing, crime against Women, Human Trafficking, Child Abuse; HIV/AIDS; Population Policy of India.

Suggested Readings:

1. Barret,H.R.(1995): Population Geography, Oliver and Boyd.
2. Bhende,A. and Kanitkar T.(2000): Principles of Population Studies, Himalaya Publishing house.
3. Bogue,Donald, J. (1969):Principles of Demography, John Wiley and Sons, New York.
4. Chandana, R.C. (1986): A Geography of Population: Concepts, Determination and pattern, Kalyani publisher, New Delhi.
5. Chandana,R.C.(2008): Geography of Population: Concepts, Determinants and Patterns,7th Edition, Kalyani Publishers, New Delhi.
6. Clarke,J.I. (1965): Population Geography, Pergamon press Ltd; Oxford.
7. Clarke,J.I.(1972):Population Geography, Second Edition,Pergamon Press Ltd; Oxford.
8. Clarke,J.I. (Ed.)(1984):Geography and Population: Approaches,Pergamon Press Ltd; Oxford.

9. Demco, G.J.; Rose, H.M. Schnell, G.A. (1970): Population Geography, McGraw Hill Book Co; New York.
10. Jones, H.R. (1990): Population Geography, Sage.
11. Jones, H.R. (2000): Population Geography, 3rd Edition, Paul Chapman, London.
12. Peters, G.L. and Larkin R.P (1979): population Geography-Problems, Concepts and Prospects, Kendall Hunt Publication Co.
13. Swain, A.K.P.C. (2008): A Text Book of Population Studies, Kalyani Publishers, New Delhi.
14. Trewartha, G.T. (1969). A Geography of Population: World Patterns, John Wiley and Sons, New York.
15. Weeks, John R. 2005: Population: An Introduction to Concepts and Issues. 9th Edition, Belmont, C.A.: Wadsworth Publication.
16. Wilson, M.G.A. (1968): Population Geography, Thomas Nelson, London.
17. Mahendra K. Premi (2001) Population of India, In the New Millennium: Census, National book trust, New Delhi.
18. Mahendra K. Premi, Dipendra Nath Das (2011) Population of India, B.R. Publishing Corporation, Delhi.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Second Semester*)

Course Name: Environmental policies and challenges
Course Code: 24GEOT201
Total Marks: 75

Course Type: Multi-disciplinary
Credits: 3

SWAYAM

Unit I-Introduction to Environment

Definition, meaning and components; Human and Environment Interaction; Humanization of Nature and Naturalization of Human; Environmental disorders: Human Impact on Land, Climate and Natural vegetation.

Unit-II Environmental Issues Global Problems

Climate change, Global warming and Ozone depletion; Local and Regional Problems: Extreme hydrological events; Deforestation and Desertification; Pollution of air and water; Depletion of Freshwater resources and Degradation of Soils.

Unit - III: Environmental Strategies

Uncertainty in managing environmental problems, Sustainable environmental development; Preservation and conservation; Integrated management and community participation in management.

Books Recommended:

11. Adams, W.M.1995: Green development: Environmental sustainability in the Third World; London: Rout ledge.
12. Alexander, D. 1993: Natural Disasters, New Delhi: Research Press.
13. Allaby, M. 1996: Basics of Environmental science, London: Routledge.
14. Baarrshes, W.H. 1996: Eco-fiction: Understanding the Environmental Debate, London: Routledge.
15. Brayant, E.A.1991: Natural Hazards, Cambridge: Cambridge University press.
16. Canter, L. W.1996: Environmental Impact Assessment, 2nd edition, New York: McGraw hill.
17. Chapman, D. 1994: Natural Hazards, Melbourne: Oxford University Press.
18. Chapman J.L. and Reiss, M.J. 1993: Ecology: Principles and applications, Cambridge: 10. Cambridge; University Press.
19. Colls, J,1997: Air Pollution: An Introduction, London: Chapman and Hall.
20. Das, R.C. and Behera, B.K. 2008: Environmental Science: Principle and Practice, Prentice Hall of India Pvt. Ltd., Delhi

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Second Semester*)

Course Name: Statistical Techniques in Geography

Course Type: SEC

Course Code:

Credits: 2

Total Marks: 50

Statistical Techniques in Geography

UNIT I : ELEMENTARY STATISTICAL METHODS

Measures of central tendency : Mean, Median and Mode; Measures of dispersion: range, quartile deviation, mean deviation, standard deviation and co-efficient of variation.

UNIT II : MEASURES OF RELATIONSHIP

Measures of association : Rank correlation -Kendall's method; Product-moment correlate co-efficient; Measures of functional relationship : Simple regression.

UNIT III : REPRESENTATION OF POPULATION AND SOCIAL DATA

Population distribution : Rural (dots) Urban (spheres); Population density (Choropleth - Nested means and Quartile method); Population growth (line graph); Age and sex pyramid; Literacy (Choropleth - Standard deviation method); Distribution of tribal population (polybar diagram).

UNIT IV : REPRESENTATION OF ECONOMIC AND TRANSPORT DATA

Land utilization (proportional divided circles); Distribution of crops (polybar diagram); Distribution of major industries (geometric symbols); Traffic flow diagram.

Books Recommended

1. Alvi, Z., 1995. Statistical Geography, Rawat Publishers, Jaipur.
2. Mahmood, A., 1986. Statistical Methods in Geographical Studies, Rajesh Pub., New Delhi.
3. Monkhouse, F. J. and Wilkinson, H.R., 1963. Maps and Diagrams, Methuen, London.
4. Singh, R.L. and Dutt, P.K., 1970. Elements of Practical Geography, Students' Friends, Allahabad.
5. Singh, L.R. and Singh, R., 1973. Manchitra avam Prayogatmak Bhoogol, Central Book Depot, Allahabad.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Second Semester*)

Course Name: Interpretation of Socio-Economic Data

Course Type: Ability enhancement

Course Code:

Credits: 2

Total Marks: 50

Interpretation of Socio-Economic Data

Unit-I: Basic Statistics

Types of statistical data, Preparation of Frequency Distribution Table, Graphical Description; Frequencies, Cross Tabulation; Central Tendency; Dispersion; Karl Pearson's and Spearman's Rank correlation, Product-moment correlation co-efficient; Measures of causal relationship: Simple regression; Coefficient of determination, Test of significance of correlation and regression coefficients

Unit-II: Representation of Socio - Economic Data

Population distribution: Rural (dot diagram) Urban (sphere diagram); population growth (line graph); Age and sex pyramid; literacy (Choropleth- Standard deviation method); Distribution of tribal population (polybar diagram); Land utilization (proportional pie diagram); Distribution of crops (simple bar, compound bar and polybar diagram); Distribution of major industries (geometric symbols); Flow of goods and services/traffic (flow diagram)

Suggested Readings:

1. Alvi, Z., 1995. Statistical Geography, Rawat publishers, Jaipur.
2. Mahmood, A., 1986. Statistical Methods in Geographical Studies, Rajesh Pub., New Delhi.
3. Monkhouse, F. J. and Wilkinson, H. R., 1963. Maps and Diagrams, Methuen, London.
4. Singh, R. L. and Dutt, P. K., 1970. Elements of Practical Geography, Students' Friends, Allahabad.
5. Singh, R. L. and Singh, R., 1973. Manchitra avam Prayogatmak Bhoogol, Central Book Depot, Allahaba

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Second Semester*)

Course Name: Digital Empowerment

Course Type: Value Added Course

Course Code: 24GEOV201

Credits: 2

Total Marks: 50

DIGITAL EMPOWERMENT

Unit-I: Digital Empowerment and Cyber Communication

Introduction to Digital Empowerment and Digital Inclusion, Needs and Challenges in bridging the Digital Divide; Digital India Programme and its Initiatives: (DigiLocker, E-Hospitals, e-Pathshala, BHIM, e-Kranti, Digital Seva Portal and e-Health Campaigns); Public utility portals of Govt. of India (RTI, Health, Finance, Income Tax filing and Education). Communication and Collaboration in Cyberspace, Methods of Electronic Communication: (Electronic mail, Blogs and Social Media); Tools/Platforms for Online Learning; Collaborative digital platforms and techniques (File sharing, Messaging, Video Conferencing).

Unit-II: Cyber security and Digital Ethics

Safe and Secure Cyberspace, Online Security and Privacy; Threats in the Digital world: (Data Breach and Cyber Attacks); Blockchain Technology; Internet of Things (IoT) and Artificial Intelligence (AI) in Cyberspace; Cybersecurity Initiatives by the Govt of India. Ethical Issues in the Digital World; Netiquettes; Ethics in Digital Communication and Cyberspace; Guidelines for responsible and Ethical Behavior in the Digital Realm.

Suggested Readings:

1. Ajay Dutta and Omika. "Digital Empowerment: Digital Transformation: Empowering People for Success" Kindle Edition.
2. David Sutton. "Cyber security: A practitioner's guide", BCS Learning & Development Limited, UK, 2017.
3. Rodney Jones and Christoph Hafner. "Understanding digital literacies: A practical Introduction". Routledge Books, 2nd edition, 2021.
4. <https://www.digitalindia.gov.in>
5. <https://www.digilocker.gov.in>
6. <https://www.cybercrime.gov.in>

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Third Semester*)

Course Name: Economic Geography

Course Code: 24GEOC301

Total Marks: 100

Course Type: Major Course

Credits: 4

Unit - I: Introduction to Economic Geography

Definition, Subject Matter and Scope of Economic geography; Approaches to the Study of Economic Geography; Classification of Economic Activities; Economic Resources: Concept and Classification.

Unit - II: Primary Activities

Geographical factors, production and world distribution of crops: rice, wheat, tea, sugarcane; Whittlesey's classification of agricultural systems; Von Thunen's model of agricultural location.

Unit-III: Secondary Activities

World Distribution and Production of Iron ore, coal, petroleum; Factors of Industrial location; Distribution and potential growth of Iron and Steel industry, Cotton Textiles Industry; Weber's theory of industrial location.

Unit - IV: Tertiary Activities

Changing forms of international trade; International trade with references to GATT and WTO; Free trade initiatives; Regional Trade Organizations: SAARC, OPEC, BRICS.

Suggested readings:

1. T. A. Hartshorn and J. W. Alexander: Economic Geography, Latest edition. Prentice Hall, PHI Learning New Delhi.
2. P. K. Roy: Economic Geography - A Study of Resources. Latest Edition, New Central Book Agency
3. W. P. Anderson: Economic Geography, Latest Edition. Routledge
4. R. Knowles and J. Wareing: Economic and Social Geography Made Simple, Latest Edition. Rupa Publications
5. B. J. L. Berry, E. C. Conklin and M. D. Ray: The Geography of Economic System, Latest edition. Prentice Hall
6. J. L. Guha and P.R. Chatterji: A New Approach to Economic Geography – A Study of Resources, Latest Edition. World Press, Kolkata
7. G. Alexandersson: Geography of Manufacturing, Latest Edition. Prentice Hall, New Delhi
8. Hartshorn, T.A. and Alexander, J.W. 1988: Economic Geography, Prentice Hall India, New Delhi.
9. Jones, C.F. and Darkenwald, G.G. 1954, Economic Geography, Macmillan, New York.
10. Leong. G.C. and Morgan, G.C. 1975: Human and Economic Geography, Oxford University Press, Hong Kong.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Third Semester*)

Course Name: Resource Geography

Course Code: 24GEOC302

Total Marks: 100

Course Type: Major Course

Credits: 4

Resource Geography

Unit - I: Introduction

Definition of resources: context of becoming a resource; nature of resources (exhaustibility, degradability, renew ability and substitutability); resources and market, technology and culture; significance of resources: backbone of economic growth and development; pressure on resources.

Unit - II: Classification of Resources

Different approaches to classification of resources; Exhaustible and inexhaustible, capital and stock, renewable and non-renewable, biotic and abiotic; and Types of resources by their uses.

Unit - III: Geographical Patterns of Resource Endowment

Geographical distribution of major food crops, livestock and fishery resources; Distributional patterns of biodiversity, forests, energy, land, freshwater and mineral resources; and world resource regions.

Unit - IV: Conservation and Management of Resources

Philosophy and Approaches to Conservation of Resources; Conservation of Major Resources: Soil, water, forest and minerals; Importance of biodiversity and its conservation; Resource appraisal and policy making; Management methods of resources; Resource Development and Sustainable resource management.

Suggested Readings:

1. Roger Perman, Yue Ma and James Mc Gilvray (1997): Natural Resources and Environmental Economics, II Edition, Addison Weley Longman Ltd, Singapore.
2. John Bowers (1997): Sustainability and Environmental Economics, Addison Weley Longman Ltd, Singapore.
3. David W. Pearce and Kerry R. Turner (1999): Economics of Natural Resources and the Environment, The Johns Hopkins University press, Baltimore.
4. Adams, W.M. (1990): Green Development: Environment and Sustainability in the Third World, Routledge and Chapman Hall, New York.
5. Burton, I. and Kates, R.W. (1978): Readings in Resources Management and Conservation, McGraw Hill, New York.
6. Clark, G.L; Feldman, M.P. and Gertler, M.S. (Eds.) (2000): The Oxford Handbook of Economic Geography, Oxford University Press, Oxford and New York.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Third Semester*)

Course Name: Bio Geography

Course Code: 24GEOM301

Total Marks: 100

Course Type: Minor Course

Credits: 4

Unit- I: (Basic of Biogeography)

Introduction and history of biogeography: Nature, Scope and Content; Significance of Biogeography and its relation to other Sciences;

Ecological foundations of Biogeography: Biosphere and Ecosphere - Definition, Nature and Hierarchy of structure (Organism, Species, Population, Community, Ecosystem, and Biome); Bio geographical processes: speciation, diversification and extinction;

Ecosystem Structure and Functioning: Components, Trophic Structure, Food Chain and Food Web, Ecological Pyramids, Laws of Thermodynamics- Energy Flow in ecosystem, Ecological succession from sere to climax stage; Biogeochemical Cycles (Carbon and Nitrogen Cycle).

Unit- II: (Plant Geography)

Plant geography: development and scope; Evolution of plants, Classification of plants:

Taxonomic, ecological and climatic.

Plant Ecology: habitat factors; plant responses to environment: adaptation, succession and climax; domestication of plants

Phytogeographical regions; Concept of plant species, family and genera; taxonomy;

Causes and consequences of deforestation and exploitation of targeted species; Forest conservation; Agro-forestry, Social Forestry and Participatory Management of Forest/Joint Forest Management (JFM)

Concept and characteristics of degeneration and regeneration of plants.

Unit - III: (Zoo Geography)

Zoogeography: scope and development; Evolution of Species: Critical Appreciation of Darwin's Theory;

Dispersal of animals in different geological periods (Palaeozoic, Mesozoic and Cainozoic changes)

Terrestrial and Marine fauna; Dispersal and Migration of animals; Means and Barriers; Zoo-geographical regions of the world;

Unit- IV: Management strategies of Ecosystem and Ecology

Principles of physical and human ecology; Different types of Ecosystem models

Concept of biological desert; Forms and functions of marine ecosystem

International Biological Programme, Man and Biosphere Programme

Biodiversity conservation with special reference to humid tropics; Wild Life Management; Relevance of Sanctuaries, National Parks with special emphasis on India

Suggested Readings:

1. Cox, C. B., R. Ladle, and P. D. Moore. 2016. *Biogeography: An Ecological and Evolutionary Approach*. John Wiley & Sons.
2. Darlington, P. J. 1957. *Zoogeography: the Geographical Distribution of Animals*, John Wiley and Sons, New York
3. Darwin, C. 1859. *The Origin of Species*. P. F. Collier & Son
4. Flannery, T. 2015. *The Eternal Frontier: An Ecological History of North America and Its Peoples*. Grove/Atlantic, Inc.
5. Gavin, D. G. 2012. *Biogeography* in J. P. Stoltman, editor. *21st Century Geography: A Reference Handbook*. SAGE Publications, Thousand Oaks, CA.
6. Hugget, R. J. 2005. *Fundamentals of Biogeography*, 2nd Edition, Routledge, London.
7. Jackson, S. T. 2004. Quaternary biogeography: Linking biotic responses to environmental variability across timescales in M. V. Lomolino and L. R. Heaney, editors. *Frontiers of*
8. *Biogeography: New Directions in the Geography of Nature*. Sinauer, Sunderland, MA.
9. Lomolino, M. V., B. R. Riddle, J. H. Brown, and R. J. Whittaker. 2010. *Biogeography*. Fourth Edition. Sinauer Associates, Sunderland, MA.
10. MacDonald, G. M. 2003. *Biogeography: Space, Time and Life*. Wiley, New York.
11. Mathur, H. S. 2003. *Essentials of Biogeography*, Pointer Publishers, Jaipur
12. McCarthy, D. 2011. *Here Be Dragons: How the study of animal and plant distributions revolutionized our views of life and Earth*. OUP Oxford.
13. Molles, M. C. 1999. *Ecology: Concepts and Applications*. WCB/McGraw-Hill.
14. Pears, N. 1977. *Basic Biogeography*, Longman Group, London
15. Perry, D. A., R. Oren, and S. C. Hart. 2013. *Forest Ecosystems*. JHU Press.
16. Pielou, E. C. 1974. *Population and Community Ecology: Principles and Methods*. Gordon and Breach.
17. Robinson, H. 1972. *Biogeography*, MacDonald and Evans, London
18. Seddon, B. A. 1971. *Introduction to Biogeography*, Gerald Duckworth and Co., London
19. Tivy, J. 1993. *Biogeography: A Study of Plants in the Ecosphere*, Longman, London.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Third Semester*)

Course Name: Social and Cultural Geography

Course Type: Multi-disciplinary Course

Course Code: 24GEOT301

Credits: 3

Total Marks: 75

Social and Cultural Geography (SWAYAM)

Unit I: Introduction to Social Geography

Definition, Nature and Scope, and Relation with other social sciences; Key concept: Society, Organizations, Social relations, social process, spatial form, production of social space and place, wellbeing, politics, inequality, justice; Major theoretical approaches to Social Geography: Humanistic, Welfare, Marxist, and Gender Geographies (concept, patriarchy, gender space).

Unit II: Social Geography of India

Social Geography of India; Indian Society, social differentiation and regional formation in India; Race, Ethnicity, caste, class and tribes: Evolution of the concept, basis of identity, territoriality; social conflict and regional formation - case studies from different regions of India; caste-class power dynamics, social backwardness and exclusion in Indian society

Unit III: Introduction to Cultural Geography

Definition, Nature and Scope, and Relation with other social sciences; key concepts: culture, politics, identity and the other issues like, cultural landscape, ideology, hegemony, gender, class, sexuality. Morphology of cultural landscape in India; Creation of Cultural Spaces: body, home, city, nation, and globe.

Suggested Readings:

1. Ahmad, A. (1999): Social Geography, Rawat Publications, Jaipur and New Delhi.
2. Casino, V.J.D., Jr., (2009): Social Geography: A Critical Introduction, Wiley-Blackwell, Chichester.
3. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): Geography and Inequality, Oxford University Press, Oxford and London.
4. Gregory, D. and Larry, J. (eds.) (1985): Social Relations and Spatial Structures, MacMillan, London.
5. Smith, D. (1977): Geography: A Welfare Approach, Edward Arnold, London.
6. Hammett, C. (eds.) (1996): Social Geography: A Reader, Arnold, London.
7. Harvey, D. (1973): Social Justice in the City, University of Georgia Press, Athens.
8. Sen, A. (2000): Social Exclusion: Concept, Application, and Scrutiny, Social Development Papers No. 1, Asian Development Bank.
9. Sibley, D. (1995): Geographies of Exclusion, Routledge, London.
10. Anderson, K., Domosh, M., Pile, S., & Thrift, N. (eds.). 2002. Handbook of cultural geography, Sage.

11. Blunt, A. 2005. Cultural geography: cultural geographies of home. *Progress in human geography*, 29(4), 505-515.
12. Cavallaro, D. 2001. *Critical and Cultural Theory: Thematic Variations*, Athlone Press, London and New Brunswick, NJ.
13. Hirsch, E and Hanlon, M. 2003. *The Anthropology of Landscape: perspectives on space and Place*, Oxford: Clarendon press
14. Lorimer, H. 2005. Cultural geography: the busyness of being more-than representational'. *Progress in human geography*, 29(1), 83-94.
15. Mitchell, D. 2000. *Cultural Geography: A Critical Introduction*, Blackwell
16. Rose, G. 2008. Looking at Landscape: The Uneasy Pleasures of Power. In *The Cultural Geography Reader* (pp. 183-187), Routledge.
17. Sauer, C. O. 1925. The Morphology of Landscape. *University of California Publications, Geography* 2, 19-54.
18. Valentine, G. 2014. *Social geographies: space and society*, Routledge.
19. Whatmore, S. 2006. Materialist returns: practising cultural geography in and for a more-than human world, *Cultural geographies*,

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Third Semester*)

Course Name: Interpretation of Socio-Economic Data

Course Type: Ability enhancement

Course Code:

Credits: 2

Total Marks: 50

Interpretation of Socio-Economic Data

Unit-I: Basic Statistics

Types of statistical data, Preparation of Frequency Distribution Table, Graphical Description; Frequencies, Cross Tabulation; Central Tendency; Dispersion; Karl Pearson's and Spearman's Rank correlation, Product-moment correlation co-efficient; Measures of causal relationship: Simple regression; Coefficient of determination, Test of significance of correlation and regression coefficients

Unit-II: Representation of Socio - Economic Data

Population distribution: Rural (dot diagram) Urban (sphere diagram); population growth (line graph); Age and sex pyramid; literacy (Choropleth- Standard deviation method); Distribution of tribal population (polybar diagram); Land utilization (proportional pie diagram); Distribution of crops (simple bar, compound bar and polybar diagram); Distribution of major industries (geometric symbols); Flow of goods and services/traffic (flow diagram)

Suggested Readings:

6. Alvi, Z., 1995. Statistical Geography, Rawat publishers, Jaipur.
7. Mahmood, A., 1986. Statistical Methods in Geographical Studies, Rajesh Pub., New Delhi.
8. Monkhouse, F. J. and Wilkinson, H. R., 1963. Maps and Diagrams, Methuen, London.
9. Singh, R. L. and Dutt, P. K., 1970. Elements of Practical Geography, Students' Friends, Allahabad.
10. Singh, R. L. and Singh, R., 1973. Manchitra avam Prayogatmak Bhoogol, Central Book Depot, Allahaba

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Third Semester*)

Course Name: Acquisition and Analysis of Climatic Data

Course Type: VAC

Course Code:

Credits: 2

Total Marks: 50

Acquisition and Analysis of Climatic Data

Unit -I: Climatic Data: Introduction

Climatic Data: Concept and Utility; Types of Climatic Data: Temperature, Pressure, Humidity, Rainfall, Surface wind, Insolation, Clouds; types and their role in weather, Role of climatic data in Weather forecasting.

Unit II Climatic Data: Acquisition

Weather Instruments: Thermometer; Barometer; Wind vane; Rain gauge, Data sources: Weather Stations, Indian Meteorological Department, National Remote Sensing Centre (NRSC), Weather monitoring Satellites.

Unit III Analysis of Data

Interpretation of weather data: Temperature- Mean, Monthly, Diurnal range and trend analysis; Humidity; relative and absolute; Rainfall- trend and pattern; Wind speed and direction.

Unit IV Representation of Data

Climatic data representation: Iso-lines, Isobars, Line graphs; Wind roses; Climograph; Rainfall dispersion diagram; Ergograph, Synoptic charts; Weather maps

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Fourth Semester*)

Course Name: Hydrology
Course Code: 24GEOC401
Total Marks: 100

Course Type: Major Course
Credits: 4

Hydrology

UNIT – 1: Introduction to Hydrology and Water Cycle

Definition, scope, and importance of hydrology; Earth's water balance and water distribution; Components of the hydrologic cycle (evaporation, condensation, precipitation, runoff, infiltration); Water budget.

Unit 2: Precipitation, Runoff, and Stream Flow

Precipitation types, measurement, and analysis; Runoff processes (surface runoff, subsurface flow, base flow); Stream flow characteristics (discharge, velocity, sediment load); Hydrograph analysis and flood frequency analysis.

Unit 3: Groundwater and Watershed Hydrology

Groundwater occurrence, movement, and aquifer characteristics; Groundwater recharge, discharge, and contamination; Watershed concepts (delineation, hydrologic units); Watershed management and hydrologic modelling.

Unit 4: Water Resources Management and Hydrologic Applications

Water supply and demand management; Water quality and pollution issues; Climate Change

Impact on Ground Water Resources; Remote sensing and GIS applications in hydrology.

Developmental and water related issues.

Reference Books:

- Sharma, G. D. (2013). Hydrology and water resources engineering. S. Chand Publish.
- Ward, A. D., & Trimble, S. W. (2014). Hydrology: Principles, processes, and modeling. CRC Press.
- Dingman, S. L. (2015). Physical hydrology (3rd ed.). Waveland Press.
- Brutsaert, W. (2005). Hydrology: An integrated approach. Cambridge University Press.
- Viessman Jr., W., Lewis, G. L., & Knapp, J. W. (1989). Introduction to hydrology (3rd ed.). Harper & Row.
- Todd, D. K., & Mays, L. W. (2005). Groundwater hydrology (3rd ed.). Wiley.
- Walton, W. C. (1970). Groundwater resource evaluation. McGraw-Hill.
- Singh, V. P., & Frevert, D. K. (2006). Hydrologic modeling. Water Resources Publications.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Fourth Semester*)

Course Name: Photogrammetry

Course Code: 24GEOC402

Total Marks: 100

Course Type: Major Course

Credits: 4

Photogrammetry

Unit I: Introduction to Photogrammetry

Historical background of Photogrammetry; Types of Photogrammetry; Role of photogrammetry in surveying and mapping; Recent trends in Photogrammetry; Aerial and Close-range Photogrammetry; Geometric Accuracy.

Unit II: Aerial Photography and Image Interpretation

Fundamentals of Aerial Photography: Principal Point and Conjugate Principal Point; Border information of aerial photographs; Elements of Aerial Photo Interpretation; Flight planning and Resolution; Types and Geometry of Aerial Photographs; Projection of Aerial Photograph; Relief displacement.

Unit III: Stereo-photogrammetry

Stereoscopy and stereoscopic parallax: Parallax bar, Floating mark; Stereo-photogrammetry: Degrees of freedom in single aerial photograph; Photogrammetric stereo plotters and mapping instruments, Pocket Stereoscope and Mirror Stereoscope.

Unit IV: Analytical and Digital Photogrammetry

Basics of Analytical Photogrammetry: Concept of Rotation Matrix; Concept of Digital Photogrammetry: Digital data input; satellite based digital photogrammetry; Concept of DEM, DSM and DTM and Orthoimage; Principles of digital photogrammetry, Image measurement, Orientation procedure, Epipolar geometry, Mosaics of DTM & ortho images.

Suggested Readings:

Cliff Greve and ASPRS Digital Photogrammetry: An Addendum to Manual of Photogrammetry.

Paine D. P., Kiser J. D. (2012) Aerial Photography and Image Interpretation, John Wiley & Sons, Inc.

EGELS, Y. -- KASSER, M. Digital Photogrammetry London Taylor & Francis 2002 0-748-40945-9

Moffitt F.H. (1980) Photogrammetry, 3rd Ed, Harper & Row, NY.

Kasser Michel and Egles Yves Digital Photogrammetry. Taylor & Francis. London & New York.

Mikhail Edward, Bethel James and McGlone J Chris Introduction to Modern Photogrammetry, John Wiley & sons

Paul Wolf (1983) Elements of Photogrammetry, McGraw Hill.

Sanjib K. Ghosh. 2005. Fundamentals of computation Photogrammetry. Concept publishing, New Delhi.

Toni Schenk: Digital Photogrammetry, Volume I., TerraScience.

Lillesand T.M., Kiefer R.W. and Chipman J.W. (2003) Remote Sensing and Image Interpretation, 5th ed., Wiley.
Zorn H.C. (1980) Introductory Course in Photogrammetry, 6th Ed. ITC, Netherlands.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Fourth Semester*)

Course Name: Remote Sensing Techniques

Course Code: 24GEOC403

Total Marks: 100

Course Type: Major Course

Credits: 4

Remote Sensing Techniques

Unit I

Introduction, Historical Development of Remote Sensing, Remote Sensing as a Tool for Geographers, Aerial Photography, Photo Interpretation, Satellite Remote Sensing, Remote Sensing Data Acquisition and Analysis, Remote Sensing Processes.

Unit II

Basic Principles of Remote Sensing: Electromagnetic Radiation, Electromagnetic Spectrum, Atmospheric Interaction with Electromagnetic Radiation, Energy Interaction with Earth's Surface Material, Spectral Signature and Curve.

Unit III

Remote Sensing Platforms and Sensors, Satellite System Parameters, Sensor parameters: Spatial Resolution, Spectral Resolution, Radiometric Resolution, Imaging Sensor Systems: Multispectral Imaging Sensor System, Thermal Sensing System, Microwave Imaging System, Earth Resource Satellites: Landsat, SPOT and IRS Satellite Programme System, Contemporary Satellite Systems.

Unit IV

Microwave Remote Sensing: Introduction, The Radar Principle, Factors Affecting Microwave Measurements, Side Looking Airborne Radar (SLAR) System, Synthetic Aperture Radar (SAR), Interpretation of SAR Images. Hyperspectral Remote Sensing, LiDAR.

Suggested Readings:

1. Lillesand, Kiefer, and Chipman - Remote Sensing and Image Interpretation
2. James B. Campbell, Randolph H. Wynne- Introduction to Remote Sensing
3. George Joseph and C Jeganathan - Fundamentals Of Remote Sensing
4. John R. Jensen - Remote Sensing of the Environment : An Earth Resource Perspective
5. Floyd F. Sabins Jr – Remote Sensing – Principles, Interpretation and Applications

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Fourth Semester*)

Course Name: Contemporary Issues in Agricultural

Course Type: Minor Course

Course Code: 24GEOM401

Credits: 4

Total Marks: 100

Contemporary Issues in Agricultural

UNIT-I

Aims, objectives and scope of Agricultural Geography; Basic concepts, Historical perspective and recent trends, Approaches to study of Agricultural Geography-Regional and Systematic approach, Ecological and Commodity approach.

UNIT- II

Factors of agricultural growth and performance, Whittlesey's classification of agricultural systems of the world-problems and prospects of agriculture and its economic impact in regions of the world.

UNIT-III

Concept of land use, Agricultural land use - land capability classification and land use planning for agricultural development, Agro-climatic regionalization – Land Use Location Theory – Von Thunen and its applicability: Modern Theories of Agricultural Location: Optimum Physical and Economic Conditions and limit.

UNIT-IV

Green Revolution in India, impact of Green Revolution in Indian agriculture, Green Revolution and regional Imbalances, Problems of Indian agriculture, Measures for agricultural development, Concept of Second Green Revolution in India.

Suggested Readings:

1. Dukhan, A.N., & Masfield, G.B, Farming System of the World, London, 1970.
2. Griggs, D.G., An Introduction to Agricultural Geography, 1964.
3. Husain Majid, Agricultural Geography, New Delhi.
4. John. R. Tarrant, Agricultural Geography.
5. Mohammad. A., Food production and Food Problem in India, New Delhi.
6. Mohammad, N., Perspectives in Agricultural geography, New Delhi.
7. Shafi. M., Agricultural Geography of South Asia, McMillon, New Delhi, 2000.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Fourth Semester*)

Course Name: Introduction to Disaster Management

Course Type: VAC

Course Code:

Credits: 2

Total Marks: 50

Introduction to Disaster Management

Unit - I: Introduction

Disasters: Concept and Nature, Magnitude and Types; Consequences of Disaster; Social, Economic and Environmental.

Unit - II: Vulnerability, Preparedness and Risk Assessment

Risk and Vulnerability: Concept and Classification, Types of Risk and Vulnerability, Disaster Preparedness; Concept and Nature, Public Awareness Programs.

Unit - II: Mitigation and Planning

Meaning, Concept and Strategies of Disaster Mitigation, Pre-Disaster and Post-Disaster planning, Role of International Agencies in Disaster Mitigation and Planning, Significance of Information Technology, Remote Sensing and GIS in Planning and Management

Unit - IV: National Perspective

Disaster Prone Areas of India; Seismic Zones, Areas prone to Floods and Droughts, Landslides, Cyclones, Industrial Disaster, National Disaster Management Plan (NDMP)-2016.

Books Recommended:

1.
Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
2.
Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
3.
Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
4.
Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi
5.
Government of India, 1997, Vulnerability Atlas of India, New Delhi
6.
Sahni, Pardeep et.al. (Eds.) 2002, Disaster Mitigation, Experiences and Reflections. Prentice Hall of India, New Delhi.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Semester-V*)

Course Name: Regional Planning & Development

Course Type: Major (Core)

Course Code: DSC 10

Credits: 4

Total Marks: 100

UNIT - I: BASIC CONCEPTS

Region: Concepts and types; Formal and functional; Delineation of region. Development and Planning: Concepts, need and scope; Types of planning.

UNIT - II: FRAME WORK OF DEVELOPMENT AND PLANNING

Regional devolvement: concepts, levels, and indicators; Regional Planning: concepts and scope; Levels of planning: local, regional, national and multi-level; Master Plans; Environmental issues in regional planning; Planning for sustainable development.

UNIT - III: THEORIES AND MODELS

Theories and models of the regional development: Hirschman's model; Growth centers and Growth pole theory of Perroux, Rostow's model; Gunnar Myrdal model.

UNIT - IV: PLANNING AND REGION

Five Year Plans; Command Area Development, planning for backward areas, Integrated Watershed Management Programme; Hill and Tribal Area Development; Decentralized Planning and Panchayati Raj; Regional Economic Imbalances and inequalities in India; SEZs in regional development.

BOOKS RECOMMENDED:

1. Mishra. R. P. (1992). Regional planning: concepts, techniques, policies and case studies.
2. Bhat. L. S. (1972) Regional planning in India.
3. Chaudhary. J.R. (2001) Introduction to Development and Regional Planning: With Special
4. Reference to India.
5. Mishra. J. Sinha. C. (1985) Planning and regional development in India.
6. Prasad B.K. (2005) India's development agenda: issues, challenges and policies.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (*Semester-V*)

Course Name: Rural Development
Course Code: DSC 11
Total marks: 100

Course Type: Major Core
Credit: 4

RURAL DEVELOPMENT

UNIT – I Conceptual and Spatial Framework

Definition, Nature, and Scope of Rural Development; Objectives and Significance in the Indian Context; Characteristics of Rural Society and Rural Economy; Rural-Urban Linkages; Sustainable rural development: Principles; Indicators and SDGs.

UNIT – II Rural Economy, Livelihoods, and Technological Interventions

Rural Economy and Livelihood Diversification; Agricultural Systems; Rural Industries, Cottage industries and MSMEs, Entrepreneurship and Microfinance; Technological Change in Rural Areas: Impact of Green Revolution. Climate Change and Rural Livelihoods: Adaptation; Resilience; and Mitigation Strategies.

UNIT – III Unit III: Sectoral Dimensions and Programmes

Agriculture and Allied Activities; Green Revolution and Agricultural Diversification; Rural Employment and Skill Development; Major Rural Development Programmes: Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA); National Rural Health Mission (NRHM); National Rural Livelihood Mission (NRLM)

Unit IV: Contemporary Issues and Emerging Challenges

Rural Poverty and Food Insecurity; Migration and Rural Transformation; Gender and Inclusive Rural Development; Climate Change and Rural Livelihoods; Land Degradation and Sustainable Land Management.

Suggested Readings:

1. Chambers, R. (1997). *Whose reality counts? Putting the first last*. London: Intermediate Technology Publications.
2. Chambers, R. (1983). *Rural development: Putting the last first*. London: Longman.
3. Chand, M., & Puri, V. K. (2011). *Regional planning in India*. New Delhi: Allied Publishers.
4. Desai, V., & Potter, R. B. (Eds.). (2014). *The companion to development studies* (3rd ed.). London: Routledge.
5. Joshi, P. C., & Maheswari, S. R. (2016). *Rural sociology and development*. New Delhi: Rawat Publications.
6. Singh, K. (2009). *Rural development: Principles, policies and management* (3rd ed.). New Delhi: Sage Publications.
7. Todaro, M. P., & Smith, S. C. (2020). *Economic development* (13th ed.). New York: Pearson.
8. World Bank. (2007). *World development report 2008: Agriculture for development*. Washington, DC: World Bank.
9. Venkata Reddy, K. (2012). *Rural development in India: Poverty and development programmes*. New Delhi: Himalaya Publishing House.

Sarap, A. (2010). *Interventions in rural development: Role of participation and decentralization*. Jaipur: Rawat Publications.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (Semester-V)

Course Name: Cartography & Land Surveying (Practical)

Course Type: Major (Core)

Course Code: DSC 12

Credits: 4

Total Marks: 100

Unit I: Fundamentals of Cartography

Definition, scope, and significance of cartography; Types and classification of maps; Scale: Definition and methods of representation; Construction of scales: Plain scale, Diagonal scale, Comparative scale, and Vernier scale; Enlargement and reduction of maps: Instrumental and graphical methods; Elements of map design: Title, legend, orientation, marginal information, and colour conventions.

Unit II: Map Projections and Representation Techniques

Map projections: Definition, principles, and classification; Graphical construction of projections: Cylindrical Projections: Cylindrical Equal Area and Mercator's; Conical Projections: One and Two Standard Parallels, Bonne's, and Polyconic; Zenithal Projections: Gnomonic, Stereographic, Orthographic, Equal Area, and Equidistant; and Conventional Projections: Sanson-Flamsteed and Mollweide; Diagrammatic and cartographic representation of data: Line, bar, circle, and pie diagrams; Thematic mapping: Dot, Choropleth, Isopleth, and Flow maps.

Unit III: Fundamentals of Surveying and Plane Table Methods

Surveying: Definition, principles, purpose, and classification; Types of surveys: Plane and Geodetic, Topographical, and Cadastral; Survey instruments: Chain, Tape, Compass, Plane Table, Dumpy Level, Theodolite; Plane Table Survey: Radiation, Intersection, and Resection; Prismatic Compass Survey: Open and closed traverse.

Chapter IV: Levelling, Contouring and Angular Measurement

Levels: Definition, types, and uses; Levelling by Dumpy Level – Simple and Differential methods; Contouring: Definition, characteristics, methods and its uses; Contouring with Indian Pattern Clinometer; Measurement of angles: Vertical angles using Sextant, Horizontal angles using Theodolite.

Suggested Readings:

1. Garnett, A. (1981). *Geographical Interpretation of Topographical Maps*. George Harrap Co., London.
2. Ishtiaq, M. (1994). *Practical Geography*. Jawahar Publications, New Delhi.
3. Monkhouse, F.J. & Wilkinson, H. (1963). *Maps and Diagrams*. Methuen & Co., London.
4. Indrapal & Mathur, H. (1987). *Manchitra Avam Prakchep*. Rajasthan Hindi Granth Academy, Jaipur.
5. Sarkar, A.K. (1997). *Practical Geography: A Systematic Approach*. Orient Longman, Calcutta.
6. Richards, J.P. (1988). *Manchitra Prakchepon Ka Parichayatmak Adhyan*. M.P. Hindi Granth Academy.
7. Alvi, Z. (1994). *Text Book of Surveying*. Vikas Publishers, New Delhi.
8. Kanetkar, T.P. & Kulkarni, S.V. (1985). *Surveying and Levelling*. Poona Vidhyarthi Griha Prakashan, Pune.
9. Singh, R.L. & Dutt, P.K. (1970). *Elements of Practical Geography*. Students Friends, Allahabad.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Semester-I*)

Course Name: Natural and Anthropogenic Hazards

Course Type: Minor

Course Code: DSE

Credits: 4

Total Marks: 100

NATURAL AND ANTHROPOGENIC HAZARDS

Unit I: Fundamentals of Natural and Anthropogenic Hazards

Concepts and definitions of hazard, disaster, vulnerability, exposure and risk; classification of hazards into natural, anthropogenic and socio-natural; disaster risk drivers including environmental degradation, unplanned urbanization, climate change and socio-economic inequalities; overview of Sendai Framework for Disaster Risk Reduction and Sustainable Development Goals.

Unit II: Natural Hazards – Types, Processes and Impacts

Geological hazards including earthquakes, tsunamis, landslides, volcanic eruptions; hydrometeorological hazards including floods, cyclones, droughts, heatwaves, cold waves; biological hazards including epidemics, pandemics, locust infestations; environmental and socio-economic impacts; traditional and scientific approaches to monitoring, forecasting, and early warning.

Unit III: Anthropogenic Hazards – Types, Causes and Consequences

Industrial hazards including chemical spills, gas leaks, explosions, and nuclear accidents; environmental hazards including deforestation, desertification, land degradation, and pollution (air, water, soil, noise); transport-related hazards including road, rail, air, and maritime accidents; urban hazards such as building collapses, fires, and hazardous waste; socio-political hazards including conflict, terrorism, and migration crises; risk amplification due to human activity; prevention, preparedness, and mitigation measures.

Unit IV: Hazard Assessment, Risk Reduction, and Case Studies

Hazard, vulnerability, and capacity assessment (HVCA) methodologies; integration of local and scientific knowledge in hazard analysis; multi-hazard risk assessment approaches; policy frameworks and institutional mechanisms in India for hazard management; Bhopal Gas Tragedy, Chernobyl disaster, Kedarnath floods, Latur earthquake, and COVID-19 pandemic.

Suggested Readings:

1. Coppola, D. P. (2020). Introduction to International Disaster Management (4th Ed.). Elsevier.
2. Burton, I., Kates, R. W., & White, G. F. (1993). The Environment as Hazard. Guilford Press.
3. Keller, E. A., & DeVecchio, D. E. (2019). Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes (5th Ed.). Pearson.
4. Smith, K. (2013). Environmental Hazards: Assessing Risk and Reducing Disaster (6th Ed.). Routledge.
5. Gupta, H. K. (2003). Disaster Management. Universities Press.
6. NDMA (National Disaster Management Authority). National Policy on Disaster Management (2009).

7. MoEFCC (2018). India's National Action Plan on Climate Change (NAPCC). Government of India.

DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Semester-V*)

Course Name: Image Interpretation

Course Type: SEC

Course Code: Image Interpretation

Credits: 3

Total Marks: 75

Unit I

Introduction, Nature and Scope of Photogrammetry, Fundamental Concepts of Photogrammetry, Types and Scale of Aerial Photographs.

Unit II

Determination of Photo Scale, Construction of Instrument Base, Photo Base and Stereo Modal, Determination of Height of Objects Using Single Vertical Aerial Photograph

Unit III

Detection of Defined Objectives: Interpretation of Stereo Grams: Fluvial and Industrial, Interpretation of Stereo Pair, Interpretation of Salt Affected and Ravenous Areas

Unit IV

Satellite Imageries: Types and border Information, Feature Identification from Multiband Imageries, Interpretation of FCC for Landuse/Land cover Mapping: Chandigarh/Kolkata/Delhi, Banaras.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Semester-VI*)

Course Name: Geographical Thought

Course Type: Major (Core)

Course Code: DSC 13

Credits: 4

Total Marks: 100

Geographical Thought

UNIT-I:

Development and Evolution of Geography as Discipline Place of geography in the classification of knowledge, Changing nature and scope of geography: Fundamentals concepts of geography; Approaches to Geography; Dualism and dichotomy in Geography; Anomalous character and contemporary relevance of geography

UNIT-II:

Development in ancient and Medieval times Contribution of Greek, Roman and Arab and Indian Geographers; Broadening horizons: Impact of voyages and discoveries; Renaissance and its impact on Geographical Thought; Foundation of Scientific Geography: contributions of Varenus and Kant.

UNIT - III:

Foundation of Modern Geography Founders of modern Geography: Contribution of Humboldt and Ritter; Darwin's impact on Geography during the latter half of the nineteenth century; School of thoughts in Geography- German, French, British, American, India and Russia, Schaefer-Hartshorne debate, Exceptionalism

UNIT - IV:

Modern concepts in Geographical Thought Empiricism, Positivism, and Quantitative revolution, Humanistic geography; Behavioralism in Geography; Radical geography; Applied Geography; Modernism and Post modernism in Geography; Modern concepts: Pragmatism, Functionalism, Idealism, Phenomenology and realism

Books Recommended:

1. Dickinson. 1969. The Maker's of Modern Geography. Routledge and Kegan Paul, London.
2. Hartshorne. R. 1939. The Nature of Geography. Association of American Geographers, Lancaster, Pennsylvania.
3. Hartshorne. R. 1959. Perspective on the Nature of Geography. Rand McNally and Company, Chicago.
4. Harvey, D. 1991. The Condition of Post Modernity: An Enquiry into the Origins of Cultural Change. Wiley-Blackwell, Oxford.
5. Husain, M. 2002. Evolution of Geographic Thought (also in hindi). Rawat Publications, Jaipur.
6. Singh, J. 1988. Bhaugolik Chenta ka karam vikas. Gyanodaya. Gorakhpur.
7. Peet, R. 1998. Modern Geographical Thought. Blackwell, Oxford.
8. Adhikari, S. 2015. Fundamentals of Geographical Thought. Orient Blackswan. Hyderabad, India

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (Semester-VI)

Course Name: GIS & GPS

Course Type: Major (Core)

Course Code: DSC 14

Credits: 4

Total Marks: 100

Unit-1: Basics of GIS

Definition, concept, and evolution of GIS; Components of GIS; Function of GIS; Relationship of GIS with Remote Sensing (RS) and GPS; Overview of major GIS software: Open and Commercial; Cloud-based and web GIS platforms (Google Earth Engine); Importance and applications of GIS in various disciplines.

Unit-2: Data Models and Management

GIS data types: spatial and non-spatial; Spatial data models: raster and vector; Data structures and topology; Spatial data sources: maps, satellite imagery, GPS survey, and open data portals; Data inputs and outputs; Georeferencing and map projections; Coordinate systems; Spatial database management systems (DBMS); Metadata and data quality standards.

Unit 3: Spatial Analysis and GIS Operations

Concept of spatial analysis; Data querying and selection; Spatial overlay and buffering; Distance and proximity analysis; Raster map algebra; Interpolation techniques; Network and surface analysis; Terrain mapping analysis; Visualisation and cartographic modelling.

Unit 4: GIS Applications

Applications of GIS in environmental management, agriculture, water resources, forestry, and urban planning; Application of proximity analysis in urban growth, service accessibility, and pollution mapping; Application of spatial interpolation in climate and air quality studies; Use of AHP (Analytical Hierarchy Process) and weighted overlay in multi-criteria decision analysis (MCDA) for site suitability and environmental issues; GIS-based disaster management and risk assessment.

Recommended Readings:

1. Chang, K. T. (2012). Introduction to geographic information systems (Vol. 418). New York: McGraw-Hill.
 2. Heywood, I., Cornelius, S., & Carver, S. (2005). An introduction to geographical information systems. *Coordinates*, 50, 19-932782.
 3. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems*. John Wiley & Sons.
 4. Tomlinson, R. F. (2007). *Thinking about GIS: geographic information system planning for managers* (Vol. 1). ESRI, Inc..
- Chapman, G. (2002). The ESRI Guide to GIS Analysis. Volume 1 Geographic Patterns and Relationships. *The Geographical Journal*, 168, 87.

**DEPARTMENT OF
GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Semester-VI*)

Course Name: Geospatial technologies (Practical)

Course Type: Major (Core)

Course Code: DSC 15

Credits: 4

Total Marks: 100

Unit -I: Introduction to Geospatial tools

Graphical user interface of Arc GIS; QGIS; Google Earth Engine; Open Source Geo-network metadata cataloging system

Unit - II: Database Creation

Spatial data input and Geo-referencing; Spatial database creation; Creation of non-spatial data sets into DBF format; Linking of Spatial data with non-Spatial data sets; Map generation at varied spatial resolutions, Spatial resolution vs. attribute uncertainty; Modifiable Areal Unit Problem (MAUP)

Unit-III: Spatial Analysis

GIS analysis: Proximity, Thematic mapping and Overlay; 3D modeling: DEM, Slope and Aspect; Geo-visualization of 3D geospatial data; Overlay and proximity analysis; Output and report generation; Modelling spatial structure from point samples, Assessing the quality of spatial predictions, Auto-correlation, Variogram and Semi-variogram analysis

Unit IV: Image Classification

Image classification: Unsupervised classification; Training sets and supervised classification using Maximum likelihood methods; Introduction to Earth Engine

Suggested Readings:

1. Bernhardsen (2003) Geographic Information Systems: An Introduction, 3ed, Wiley India Pvt. Ltd., New Delhi.
2. Demers (2004) Fundamentals of Geographic Information Systems, 3ed, Wiley India Pvt. Ltd., New Delhi.
3. Joseph George (2003) Fundamentals of Remote Sensing, University Press. Hyderabad
4. Lillesand T.M and Keifer R.W. (2000) Remote Sensing and Image Interpretation, IVth Eds. John Wiley and Sons, New York.
5. Lo C.P. & Yeung A.K.W., (2004). Concepts and Techniques of GIS, Prentice-Hall of India, New Delhi
6. LO & YEUNG (2009) Concepts and Techniques of Geographic Information Systems, 2nd ed., PHI Learning Pvt. Ltd, New Delhi.
7. Downey, A. B. (2009). Python for Software Design: How to Think Like a Computer Scientist. Cambridge University Press.
8. Sherman, G. (2012). The Geospatial Desktop: Open Source GIS and Mapping. Locate Press.
9. Swaroop C. H. (2008). A Byte of Python. <http://www.swaroopch.org>

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (Semester-VI)

Course Name: Land Use Planning
Course Code: DSE
Total marks: 100

Course Type: Minor
Credit: 4

LAND USE PLANNING

Unit I: Introduction to Land Use Planning

Concept and scope of land use and land use planning; Evolution of land use planning (global and Indian perspectives); Objectives and principles of land use planning; Theories and models of land use (Von Thünen, Burgess, Christaller); Importance of land use planning in sustainable development.

Unit II: Land Use Survey and Techniques

Methods of land use survey: field survey, cadastral records, topographical maps; Remote sensing and GIS in land use mapping; Land capability classification and land suitability analysis; Spatial analysis techniques in land use planning; Land use change detection and monitoring.

Unit III: Land Use Policy and Planning in India

Land reforms and agricultural land use policies; Urban land use planning: master plans, zoning, green belts, smart cities; Rural land use planning: agricultural land use, watershed management, rural settlement planning; Land acquisition and rehabilitation policies; Institutional frameworks and agencies in land use planning.

Unit IV: Contemporary Issues and Case Studies

Problems of land degradation, deforestation, desertification, and urban sprawl; Land use conflicts: agriculture vs. industry, urban expansion vs. ecology; Sustainable land management strategies (integrated land use planning, participatory planning); Climate change and its impact on land use; Case studies: Urban land use planning (Delhi NCR/Bengaluru); Agricultural land use planning (Punjab/Green Revolution areas); Watershed and rural land use planning (Chambal/Sukhomajri project).

Suggested Readings:

1. Chapin, F. S., & Kaiser, E. J. (1979). *Urban land use planning* (3rd ed.). University of Illinois Press.
2. Steiner, F. R. (2008). *The living landscape: An ecological approach to landscape planning* (2nd ed.). Island Press.
3. Catanese, A. J., & Snyder, J. C. (1988). *Urban planning* (2nd ed.). McGraw-Hill.
4. McHarg, I. L. (1992). *Design with nature*. Wiley.
5. Misra, R. P., & Sundaram, K. V. (1971). *Regional development planning in India: A new strategy*. Vikas Publishing House.
6. Sundaram, K. V. (1985). *Urban and regional planning in India*. Vikas Publishing House.
7. Singh, R. B. (1991). *Environmental consequences of agricultural development: A case study from the Green Revolution state of Haryana, India*. Springer.
8. Joshi, P. C., & Maheshwari, R. C. (2005). *Land reforms in India: An unfinished agenda*. Sage Publications.

9. Singh, J. & Dhillon, S.S. – *Agricultural Geography*.
10. Misra, R.P. & Ramesh, A. – *Fundamentals of Cartography* (for land use surveys).
11. Steiner, F. – *The Living Landscape: An Ecological Approach to Landscape Planning*.
12. Chapin, F.S. – *Urban Land Use Planning*.
13. Government of India Reports – *National Land Use Policy, Planning Commission Documents*.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (Semester-VI)

Course Name: Acquisition of Spatial Data (SEC)

Course Type: SEC

Course Code:

Credits: 3

Total Marks: 75

Acquisition of Spatial Data (SEC)

(Credit 3)

Unit–I: Spatial Data and Database Concepts

Concept and importance of spatial data analysis; Spatial data types and data structures; Sources of spatial data: primary and secondary; Spatial and non-spatial data creation and associated errors; Spatial data quality and metadata; Scale and resolution issues in spatial analysis, SQL (Structured Query Language): Spatial & Attribute related.

Unit–II: Spatial Analysis Techniques

Georeferencing and digitisation; Topology and common topological errors; Area and distance calculation; Spatial and attribute related query process; Develop Choropleth, density, bar and pie graph maps; Vector data analysis – buffering, overlay, and query operations; Density mapping and spatial interpolation techniques; Topographical analysis and modeling.

Unit–III: Spatial Applications

Site suitability analysis; terrain mapping and drainage density; NDVI; Land use and land cover mapping and area calculation.

Recommended Readings:

1. DeMers, M. N. (2008). *Fundamentals of geographic information systems*. John Wiley & Sons.
2. Burrough, P. A., McDonnell, R. A., & Lloyd, C. D. (2015). *Principles of geographical information systems*. Oxford university press.
3. De Smith, M.J., Goodchild, M.F., & Longley, P.A. (2022). *Geospatial Analysis: A Comprehensive Guide*. Troubador Publishing.
4. Chang, K. T. (2012). *Introduction to geographic information systems* (Vol. 418). New York: McGraw-Hill.

5. Heywood, I., Cornelius, S., & Carver, S. (2005). An introduction to geographical information systems. *Coordinates*, 50, 19-932782.

Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems*. John Wiley & Sons.

DEPARTMENT OF GEOGRAPHY

JAMIA MILLIA ISLAMIA

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Semester-VII*)

Course Name: Introduction to Geopolitics

Course Type: Major (core)

Course Code: DSC 16

Credits: 4

Total Marks: 100

Introduction to Geopolitics

Unit 1: Foundation of Geopolitics

Nature and Scope of Geopolitics; Geopolitics and Political Geography; Classical and Critical Geopolitics, Westphalian System: Evolution of Nation & State.

Unit 2: Concepts in Geopolitics

Space and Place in Geopolitics; Power and security; Territory and Sovereignty; Borders and Frontiers; Resource Geopolitics: energy politics, water, and rare earth minerals.

Unit 3: Regional and Global Geopolitics

Great power rivalry; Emerging powers: BRICS, ASEAN, SCO, EU, GCC; Indo-Pacific and maritime security; Geopolitics of South Asia and India's neighbourhood.

Unit 4: Contemporary Issues

Current Geopolitical trends: Geo-economy, Climate change and environmental geopolitics, Cyber geopolitics; Emerging world order; Role of the UN in Peace and Conflict Resolution; India's Foreign policy: Trends & Challenges.

Readings

Unit 1:

• Wallerstein, I. (2004). World-systems analysis: An introduction. Duke University Press. • Flint, C. (2006). Introduction to geopolitics. Routledge. • Agnew, J. (2003). The historic canon. In J. Agnew, K. Mitchell, & G. Ó Tuathail (Eds.), A companion to political geography (pp. 51–74). Blackwell. • Moisiu, S. (2015). Geopolitics/critical geopolitics. In J. Agnew, V. Mamadouh, A. J. Secor, & J. Sharp (Eds.), The Wiley-Blackwell companion to political geography (pp. 220–234). Wiley-Blackwell. <https://doi.org/10.1002/9781118725771.ch19> • Downie, C. (2021). Competition, cooperation, and adaptation: The organizational ecology of international organizations in global energy governance. Review of International Studies, 47(4), 493–513. <https://doi.org/10.1017/S0260210521000267> • Ó Tuathail, G. (2003). Geopolitics and critical geopolitics. In J. Agnew, K. Mitchell, & G. Ó Tuathail (Eds.), A companion to political geography (pp. 213–228). Blackwell.

Unit-2

• Gallaher, C., Dahlman, C. T., Gilmartin, M., Mountz, A., & Shirlow, P. (2009). Key concepts in political geography. SAGE Publications Ltd. • Sack, R. D. (1983). Human territoriality: A theory. Annals of the Association of American Geographers, 73(1), 55–74. <https://doi.org/10.1111/j.1467-8306.1983.tb01396.x> • Storey, D. (2012). Territories: The claiming of space (2nd ed.). Routledge. • Pitron, G. (2020). The rare metals war: The dark side of clean energy and digital technologies (B. Jacobson, Trans.). Scribe Publications. • Chellaney, B. (2013). Water: Asia's new battleground. Georgetown University Press. • Cherp, A., & Jewell, J. (2014). The concept of energy security: Beyond the four As. Energy Policy, 75, 415–421. <https://doi.org/10.1016/j.enpol.2014.09.005> • Kruyt, B., van Vuuren, D. P., de Vries, H. J. M., & Groenenberg, H. (2009). Indicators for energy security. Energy Policy, 37(6), 2166–2181. <https://doi.org/10.1016/j.enpol.2009.02.006> • Dunn Cavelty, M., & Balzacq, T. (Eds.). (2017). Routledge handbook of security studies (2nd ed.). Routledge. • Milina, V. (2007). Energy security and geopolitics. Connections: The Quarterly

Unit-3

• Baylis, J., Smith, S., & Owens, P. (Eds.). (2011). *The globalization of world politics: An introduction to international relations* (5th ed.). Oxford University Press. • Falk, R. (2004). *The Declining World Order: America's Imperial Geopolitics* (1st ed.). Routledge. <https://doi.org/10.4324/9780203485569> • Kamrava, M. (Ed.). (2011). *The international politics of the Persian Gulf*. Syracuse University Press. • Dodds, K. J. (2014). *Global geopolitics: A critical introduction*. Routledge. • Richard Allen, *Short Introduction to History and Politics of Southeast Asia* • Panikkar, K. M. (1945). *India and the Indian Ocean: An essay on the influence of sea power on Indian history*. Oxford University Press. • Mohan, C. R. (2012). *Samudra manthan: Sino-Indian rivalry in the Indo-Pacific*. Carnegie Endowment for International Peace. • Tharoor, S. (2012). *Pax Indica: India and the world of the 21st century*. Penguin Books India. • Kaplan, R. D. (2010). *Monsoon: The Indian Ocean and the future of American power*. Random House.

Unit-4

• Dittmer, J., & Sharp, J. (Eds.). (2014). *Geopolitics: an introductory reader*. Routledge. • Council on Foreign Relations. (2021). *The UN Security Council*. <https://www.cfr.org/background/un-security-council> • Ahmed, F., & Sharma, A. (Eds.). (2022). *Geo-economic Perspectives in the Global Environment*. Taylor & Francis. • Luck, E. C. (2007). Principal organs. In T. G. Weiss & S. Daws (Eds.), *The Oxford handbook on the United Nations* (pp. 651–670). Oxford University Press. • Barash, D. P., & Webel, C. P. (2013). *Peace and conflict studies* (3rd ed.). Sage Publications. • Black, J. (2016). *Maps of war: Mapping conflict through the centuries*. Conway. • Keohane, R. O., & Victor, D. G. (2011). The regime complex for climate change. *Perspectives on Politics*, 9(1), 7–23. <https://doi.org/10.1017/S1537592711000088> • Allen, R. (1984). *Imperialism and nationalism in the Fertile Crescent: Sources and prospects of the Arab-Israeli conflict*. Westview Press. • Pappé, I. (2004). *A history of modern Palestine: One land, two peoples*. Cambridge University Press. • Harsh V. Pant (ed.), *Indian Foreign Policy in a Unipolar World* (New Delhi: Routledge, 2009) Websites | UN Conference on Trade And Development FDI Country Report - www.unctad.org | UNDP Human Development Reports (various Issues) - <http://hdr.undp.org> | The Inter-Arab Investment Guarantee Corporation - <http://www.iaigc.org/> | UN Economic and Social Commission for West Asia - <http://www.escwa.un.org/>

**DEPARTMENT OF
GEOGRAPHY JAMIA MILLIA
ISLAMIA**

Detailed Syllabus for 4-Year Undergraduate Course in Geography with Research (*Semester-VII*)

Course Name: Urban Geography

Course Type: Major (Core)

Course Code: DSC 17

Credits: 4

Total Marks: 100

Urban Geography

Unit - I: Concepts and Theories of Urbanization

Urban Geography: Definition, Nature and Scope; History of urbanization: Ancient, Medieval and Modern Period; Contemporary Urban Theories: Ordinary City (Robinson), Planetary Urbanization (Brenner) and Informal Urbanization (Roy).

Unit - II: Cities: Growth Dynamics and Evolution

Dynamics of urbanization and urban growth: Urbanization curve, Urban Sprawl, Sub-urbanization, Deurbanization and Reurbanization; Urban morphology and Land use patterns; Classical models of urban growth and evolution: Concentric Zone Theory, Sectoral Model and Multiple Nuclei Model; Recent urban growth model: Cellular Automata Markov Chain Model.

Unit - III: Cities: Functions

Functional Classification of Towns: Harris, Nelson and Ashok Mitra; Law of Primate City, Rank-Size Rule; Central Place Theory and Growth Pole Theory.

Unit - IV: Cities in the Global South: Contemporary Issues and Policy Responses

Urban Poverty: Slums/Informal settlements and housing; Urban crimes; Urban pollution: Air and water; Transport problem; Urban Heat Island; Govt. Initiatives: Smart Cities Mission, AMRUT, PMAY-ARHC, National Electric Mobility Mission Plan- 2020.

Suggested Readings:

1. Berry, B.J.L. and Horton F.F; 1970 Geographic Perspectives on Urban Systems. Prentice Hall, Englewood Cliffs, New Jersey.
2. Carter, H; 1976. The Study of Urban Geography, Edward Arnold Publishers, London.
3. Drakakis-Smith, D. (1995). Third world cities: sustainable urban development, 1. *Urban studies*, 32(4-5), 659-677.
4. Hall, T; 2001. Urban Geography. Routledge, London.
5. Harvey, D. (2010). Social justice and the city (Vol. 1). University of Georgia press.
6. Hughes, Sara, Chu, Eric K., Mason, Susan G. (Eds.) (2018) Climate Change in Cities, Springer Publishers.
7. Kundu, A; 1992. Urban Development and Urban Research in India. Khanna Publication.
8. Kundu, D., & Pandey, A. K. (2020). World urbanisation: trends and patterns. In *Developing national urban policies: Ways forward to green and smart cities* (pp. 13-49). Singapore: Springer Nature Singapore.

9. Peet, R. and Thrift, N (2002). *New Models in geography: The political-economy perspective*. Unwin Hyman, London.
10. Potter, R. (2012). *Urbanization and planning in the third world: Spatial perceptions and public participation*. Routledge.
11. Potter, R.B., & Lloyd-Evans, S. (1998). *The City in the Developing World* (1st ed.). Routledge.
<https://doi.org/10.4324/978131583937>

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (*Semester-VII*)

Course Name: Disaster Risk Reduction
Course Code: DSC 18
Total marks: 100

Course Type: Major Core
Credit: 4

DISASTER RISK REDUCTION (DRR)

Unit I: Foundations of Disaster Risk Reduction

Concepts of hazard, vulnerability, exposure, capacity, risk, and disaster; historical evolution of Disaster Risk Reduction (DRR); Yokohama Strategy and Plan of Action for a Safer World; establishment of International Strategy for Disaster Reduction (ISDR), Global frameworks-Hyogo Framework for Action (2005-15) and Sendai Framework for DRR (2015-30); Prime Minister's Ten Point Agenda on DRR.

Unit II: Risk Assessment and Early Warning

Risk assessment including hazard mapping, vulnerability analysis, and capacity assessment with reference to HVCA methods; early warning systems including principles, components, and community-based approaches; multi-hazard early warning systems and their integration into DRR planning; data sources, monitoring networks, and technology integration for DRR decision-making.

Unit III: DRR Strategies, Planning and Mainstreaming

Strategies for DRR including prevention, mitigation, preparedness, response, recovery; mainstreaming DRR into development policies, urban planning, and sectoral programs; community-based DRR and inclusive approaches for vulnerable groups; principles of resilient infrastructure design and retrofitting; role of public-private partnerships in DRR; DRR financing including budgetary allocations, insurance, and risk transfer mechanisms.

Unit IV: Implementation and Emerging Frontiers in DRR

National Disaster Management Plan and sectoral DRR plans in India; international cooperation in DRR including UNDRR, IFRC, World Bank, and SAARC Disaster Management Centre; post-disaster needs assessment and damage/loss assessment methodologies; Cyclone Fani, Nepal earthquake, Japan tsunami, and COVID-19 pandemic DRR response; emerging trends in DRR such as nature-based solutions, climate-smart DRR, and the application of artificial intelligence and big data in disaster risk analysis; future challenges and research frontiers in DRR.

Suggested Readings:

- Wisner, B., Gaillard, J. C., & Kelman, I. (Eds.) (2012). *Handbook of Hazards and Disaster Risk Reduction*. Routledge.
- Alexander, D. (2018). *Principles of Emergency Planning and Management*. Dunedin Academic Press.
- Coppola, D. P. (2020). *Introduction to International Disaster Management* (4th Ed.). Elsevier.
- Shaw, R., & Krishnamurthy, R. (2009). *Disaster Management: Global Challenges and Local Solutions*. Universities Press.
- Kapucu, N., & Liou, K. T. (2014). *Disaster and Development: Examining Global Issues and Cases*. Springer.
- NDMA (2019). *National Disaster Management Plan*. Government of India.

- GoI (2016). *Prime Minister's Ten Point Agenda on DRR*.
- NIDM (2020). *India Disaster Report*. National Institute of Disaster Management, New Delhi.
- UNDRR (2015). *Sendai Framework for DRR 2015–2030*.
- UNDRR Global Assessment Reports (GAR) on DRR (biennial, latest 2023).
- World Bank & GFDRR (2014). *Financial Protection Against Natural Disasters*.
- IFRC (2022). *World Disasters Report*.
- Prime Minister's 10 Point Agenda for DRR.

DEPARTMENT OF GEOGRAPHY JAMIA MILLIA ISLAMIA

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (*Semester-VII*)

Course Name: Sustainable Development

Course Code: DSC 19

Total marks: 100

Course Type: Major Core

Credit: 4

Sustainable Development

Unit-1: Introduction

Meaning, Definition and Concept of Sustainable Development; History of Sustainable Development, Sustainable Development and Sustainability, Environmental, Social, and Economic Dimensions of Sustainable Development.

Unit-II: Sustainable Development

Issues and Challenges affecting Sustainable Development at the Local, Regional and Global Levels; Sustainable Development Challenges: Climate Change, Greenhouse Gases, Desertification, Resource Degradation, Energy, Water Resources, Pollution and Population.

Unit-III: Sustainable Development: Management and Solution

Socio-Economic Policies for Sustainable Development, Strategies for Implementing Eco-Development Programmes; Sustainable Development through Trade, Carrying Capacity, Public Participation; Carbon, Water and Ecological Foot Printing.

Unit-IV: Sustainable Development Programmes

World Commission on Environment and Development, 1987; United Nations Conference on Environment and Development, 1992 and Agenda 21; World Summit on Sustainable Development, 2002; Rio +20, Sustainable Development Goals (SDGs).

Recommended Books

- Purvis, M. & Grainger, A. (eds.) (2004). *Exploring Sustainable Development: Geographical Perspectives*. Routledge, London.
- Rogers, P. P., Jalal, K. F. & Boyd, J. A. (2008). *An Introduction to Sustainable Development*. Earthscan, London.
- Gadgil, M. & Guha, R. (1993). *This Fissured Land: An Ecological History of India*. Oxford University Press, New Delhi.
- Diesendorf, M. & Hamilton, C. (eds.) (1997). *Human Ecology, Human Economy: Ideas for an Ecologically Sustainable Future*. Allen & Unwin, Sydney.
- Brunet, R. (2013). *Sustainable Geography*. Wiley-Blackwell, Oxford.
- Sachs, J. D. (2015). *The Age of Sustainable Development*. Columbia University Press, New York.
- Griggs, D., Nilsson, M., Stevance, A. & McCollum, D. (eds.) (2017). *A Guide to SDG Interactions: From Science to Implementation*. International Council for Science (ICSU), Paris.
- Le Blanc, D. (2015). *Towards Integration at Last? The Sustainable Development Goals as a Network of Targets*. United Nations DESA, New York.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (*Semester-VII*)

Course Name: Principle of Ecology
Course Code: DSE
Total marks: 100

Course Type: Minor
Credit: 4

PRINCIPLES OF ECOLOGY

Unit I: Introduction to Ecology

Definition, Nature and Scope: Autecology and Synecology; Evolution and Development of Ecology as a Discipline; Relevance of Studying Ecology in Geography; Geography and Human Ecology Interface.

Unit II: Environmental Interaction and Adaptation

Changing Relations of Man and Environment in Historical Perspective; Amensalism, Predation, Parasitism, Competition, Commensalism, Neutralism, Mutualism; Human Adaptation and Modifications of Environment; Specific Ecosystem in Context of Human Group: Subsistence Agriculture; Commercial and Mechanized Agriculture; Industrialization and Urbanization.

Unit III: Cycling of Materials in Ecosystem

Nitrogen Cycle, Carbon Cycle, Water Cycle, Intrusion in Cycles, Acid Rain.

Unit IV: Ecosystem and Resources

Ecosystem: Definition, Components and Functions; r-k selection strategies; Types of Ecosystem; Food Chain, Food Webs; Energy Flow within the Ecosystem; Resource Utilization; Energy Consumption and Contemporary Issues.

Suggested Readings:

1. Odum, E.P. 2004. Fundamentals of Ecology. Cengage Learning, New York.
2. Arumugam, N. 2014. Concepts of Ecology. Saras Publication, Delhi.
3. Pushpam Kumar, Reddy B. Sudhakar. 2007. Ecology and Human Well Being. Sage Publication.
4. Robert Ezra Park. 2003. Human Communities: The City and Human Ecology. Freeman Press.
5. Vladimir F. Krapivin, Costas A. Varotsos. 2005. Biogeochemical Cycles in Globalization and Sustainable Development. Springer.
6. Lovett G.M., Jones C., Turns M.G., Weather K.C. 2005. Ecosystem Function in Heterogenous Landscapes. Springer
7. Yueh-Hsin Lo, Juan A. Blanco and Shovonlal Roy. Biodiversity in Ecosystem. InTech Publishers.
8. Herbert C. Hanson. 1962. Dictionary of Ecology. Philosophical Library Publisher.
9. Ehrlich, P.R., Ehrlich, A.H. and Holden, J.P. 2000 (Revised). Human Ecology. W.H. Freeman & Co. San Francisco

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (*Semester-VIII*)

Course Name: Application of RS/GIS/GPS

Course Code: DSC 20

Total marks: 100

Course Type: Major Core

Credit: 4

Unit -1

Fundamentals of Remote Sensing & Geographic Information System

Remote Sensing (Definition, Remote Sensing System, Advantages and Limitations); Electromagnetic Radiation and its Properties; Remote Sensing Platforms; Types of Satellites; Types of Resolution, Sensor System; Geographical Information System: Definition, concepts and components; Types of data (Spatial and Non-spatial); Data models (Raster and Vector); Data file and database; Creating GIS Database: GIS Software's, file organization and formats, Advantages of Data base Management System.

Unit-2

Application of Remote Sensing & Geographic Information System

Application of RS & GIS in Geology, Structural Evaluation and Geomorphology (Digital image processing techniques for geological and lithological mapping); Application of RS & GIS in water resource, agriculture & forest Study (Spatial analysis in Hydrology - NDWI, MNDWI, Digital Elevation Model Watershed and Stream Network Delineation, Terrain Analysis using Digital Elevation Models, flood inundation mapping; Interpretation of land-use and land cover; Vegetation indices - NDVI, TVI, SAVI, EVI); Urban & Regional Analysis and Planning (Urban growth and land use dynamics, transport and infrastructure mapping, population distribution, settlement analysis); Potential of Remote Sensing & GIS application in development planning and Disaster management plan.

Unit- 3

Fundamentals of Global Positioning System (GPS)

Overview of space-based navigation: Need, concept, and applications; Components of a satellite navigation system: **Space segment, control segment, and user segment**; Coordinate systems and reference frames: Geoid, ellipsoid, WGS 84, and datum; Structure and components of **Global Positioning System (GPS)**; Satellite constellation and signal structure; Concept of GNSS and comparison with GPS; Basic concepts of geodesy relevant to GNSS; Overview of major GNSS constellations (GLONASS, Galileo and IRNSS).

Unit-4

Application of Global Positioning System (GPS)

Applications and Types of GPS surveys: Static, Rapid Static, Kinematic, RTK, and DGPS; Field procedures for data acquisition; Data logging and waypoint collection using GPS; Post-processing: Correction and transformation of GPS data; Integration of GPS data with GIS and Remote Sensing datasets; Applications in land surveying, environmental monitoring, disaster management, and urban studies.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (Semester-VIII)

Course Name: Soil and Water Resource Management
Course Code: DSC 22
Total marks: 100

Course Type: Major Core
Credit: 4

Soil and Water Resource Management

Unit-1: Soil Resource and Management

Soil classification: Major soil types of India, Soil Profile & Soil texture, Soil survey and its types; soil survey techniques; Factors and processes of soil erosion; impact on environment and biosphere, Methods and Techniques of soil conservation: Importance of soil conservation in sustainable agriculture; Concept and Measures of Soil moisture conservation, Management of soil and nutrient losses.

Unit 2: Application of Soil Resources

Application of remote sensing and GIS in Soil management: Soil Mapping, soil fertility, soil moisture assessment; and Crop Planning; Methods and application for soil erosion assessment; Role of Indices in soil moisture assessment; In-situ methods for soil properties assessment.

Unit 3: Water Resources and Management

Concept of hydrological cycle, Watershed: Definition, Concept, Classification and codification of watersheds; Distribution and Types of water resources; Concept of water stress and scarcity; Water Conservation Techniques: Rainwater harvesting, Watershed management, Artificial recharge of groundwater, Irrigation Water Management: Methods of irrigation, Integrated Water Resources Management (IWRM) concept; Policies and programs for sustainable water management

Unit 4 Application of Water Resources

Application of Microwave remote sensing in water resource management: surface water management, snow and Glacier Monitoring, Ground water recharge assessment; Runoff Estimation using RS & GIS Techniques; Measurement of rainfall; Application of DEM in water resources management; role of technology in watershed management; Application of AI & ML in Water Resources Management

Further Readings:

Huffman, R. L. (2013). *Soil and water conservation engineering* (7th ed.). St. Joseph, MI: American Society of Agricultural and Biological Engineers.

Renard, K. G., Foster, G. R., Weesies, G. A., McCool, D. K., & Yoder, D. C. (1997). *Predicting soil erosion by water: A guide to conservation planning with the Revised Universal Soil Loss Equation (RUSLE)*. Agriculture Handbook No. 703. Washington, D.C.: U.S. Department of Agriculture.

Sunitha, V., Reddy, B. M., Reddy, Y. S., Prasad, M., & Kumar, B. P. (Eds.). (2025). *Remote sensing, GIS and modelling for water resource management* (Vol. 2). Singapore: Springer.

Ustin, S. (2001). Manual of Remote Sensing, Volume 4, Remote Sensing for Natural Resource Management and Environmental Monitoring, 3rd Edition, Willey Publishing
Encyclopedia of Soil Science - Second edition (2010) Edited by Rattan Lal, Publisher – Taylor & Francis

Patra, K. C. (2008). *Hydrology and water resources engineering*. New Delhi, India: Alpha Science International.

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (*Semester-VIII*)

Course Name: URBAN ENVIRONMENT MANAGEMENT

Course Type: Major Core

Course Code: DSC 23

Credit: 4

Total marks: 100

URBAN ENVIRONMENT MANAGEMENT

Unit I: Introduction to Urban Environment and Sustainability

1. Concepts, Definitions: Urbanization, urban environment, environmental sustainability.
2. Urbanization Trends: Global and Indian perspectives; rural-urban migration; megacities.
3. Urban Ecosystems: Components, functions, and services.
4. Sustainable Urban Development Goals (SDGs): UN SDG 11 and related targets.

Unit II: Urban Environmental Problems and Management Approaches

1. Urban Environmental issues and Management: Air, water, soil, noise pollution; urban heat island effect; loss of biodiversity.
2. Urban Water Management: Water supply, stormwater drainage, groundwater recharge.
3. Urban Climate Issues: Climate change impacts on cities, adaptation, and mitigation.
4. Urban Transportation and Environment: Emissions, congestion, sustainable mobility solutions.

Unit III: Tools, Techniques, and Planning for Urban Environment Management

1. Environmental Impact Assessment (EIA): Basics, process, and applications in urban projects
2. GIS and Remote Sensing: Urban environmental mapping and monitoring.
3. Green Infrastructure: Parks, green roofs, wetlands, and ecological corridors
4. Sustainable Building Practices: Energy efficiency, LEED/GRIHA ratings.

Unit IV: Policy, Governance, and Community Participation

1. Policies and Laws: Environmental Protection Act, Solid Waste Management Rules, National Urban Transport Policy, Smart Cities Mission.
2. Institutional Framework: Role of municipal corporations, urban development authorities, NGOs.
3. Public Participation in Environmental Management: Awareness, citizen science, participatory planning.
4. Financing Urban Environmental Initiatives: Public-private partnerships, Carbon Credit, Corporate Social Responsibility (CSR).

BOOKS RECOMMENDED:

1. Douglas, I. (1983). *The Urban Environment*, Edward Arnold, Maryland, USA.
2. Pacione, M. (2005): *Urban Geography: A Global Perspective*. Routledge, London and New York.
3. Cohen, B. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges. *Technology in Society*, 28(1–2), 63–80.
4. Hardoy, J. E., Mitlin, D. Satterthwaite, D. (1992). *Environmental Problems in Third World Cities*, Earthscan, Great Britain.
5. Novotny, V., & Brown, P. R. (2007). *Cities of the Future: Towards Integrated Sustainable Water and Landscape Management*. IWA Publishing, London.
6. Newman, P. (2002). *The Environmental Impacts of Cities, Environment and Urbanization*, 18: 275
7. Glasson, J., Therivel, R., & Chadwick, A. (2012). *Introduction to Environmental Impact Assessment* — Routledge, London.

8. Singh, R. B. (ed.) (2015). *Urban Development Challenges, Risks and Resilience in Asian Mega Cities*, Springer, Japan.
9. Roberts, P., Ravetz, J. and George, C. (2009). *Environment and the City*. Routledge, London.
10. Benedict, M.A., & McMahon, E.T. (2012). *Green Infrastructure: Linking Landscapes and Communities* — Island Press, Washington, DC.

DEPARTMENT OF GEOGRAPHY JAMIA MILLIA ISLAMIA

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (*Semester-VIII*)

Course Name: Geography of Health and Well-being

Course Type: Major Core

Course Code: DSC 24

Credit: 4

Total marks: 100

Geography of Health and Well-being

Unit-I: Concepts, Approaches and Determinants

Basic Concepts, Scope and Significance of Health, Disease and Well-being; Approaches to the Study of Health Geography: Ecological, Social and Spatial; Approaches to the Study of Well-being: Need-based, Relative Standard and Capability; Geographical Factors Affecting Health and Well-being.

Unit-II: Diseases and their Typology

WHO Classification of Diseases and their Major Types: Genetic; Communicable and Non-communicable; occupational and Deficiency Diseases; Epidemics and Pandemic; Sources of Health Data: NFHS, LASI, NSSO.

Unit-III: Global Patterns of Health and Well-being

Ecology, Etiology, Diffusion and Distribution Pattern of Malaria, Tuberculosis, Hepatitis, AIDS, Glycemia and Cardiovascular Diseases; Poverty; Food Security; Nutrition Deficiency; Health and WASH Facilities.

Unit-IV: International and National Concerns

Role of WHO, UNICEF, Red Cross; Indian Health Care Planning: Child and Family Health Welfare, Immunization, Rural and Urban Health, Health for All Programmes, National Health Care Infrastructure; Digital Health and GIS.

Suggested Readings:

1. Cliff, A. D., Haggett, P., & Smallman-Raynor, M. (2004). *World atlas of epidemic diseases* (pp. 56-60). London: Arnold.
2. Digby, A., & Stewart, J. (Eds.). (1998). *Gender, health and welfare*. Psychology Press.
3. Emch, M., Root, E. D., & Carrel, M. (2017). *Health and medical geography*. Guilford Publications.
4. Gatrell, A. C., & Elliott, S. J. (2014). *Geographies of health: An introduction*. John Wiley & Sons.
5. Herrick, C. (2017). *Global health and geographical imaginaries*. Routledge

6. Johnston, R. J. (1981). The dictionary of human geography. In *The dictionary of human geography*. Basil Blackwell.
7. Knox, P.L. (1975). Social Well-being: A Spatial Perspective, Oxford University

**DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA**

Detailed Syllabus for 4 – Years Undergraduate Course in Geography (*Semester-VIII*)

Course Name: Energy and Climate Change

Course Type: Minor

Course Code: DSE

Credit: 4

Total marks: 100

Energy and Climate Change

Unit-I Introduction

Climate change: Historical Perspective and overview; Myths and reality of climate change. Green House Effect and Global Warming; Causes and Consequences of Climate Change; Policies and Politics of Green House: conventions, treaties, negotiation; Energy types and trends of energy use; Impact of energy on environment; observations and projections; Climate change and global issues; energy conservation; energy and climate change.

Unit-II Human and Natural influence on Climate

Anthropogenic activities affecting Climate: Industries, solid and E-waste; Natural Process of climate change: Changes in the Earth's Orbit and Rotation, Variations in Solar Activity, Changes in the Earth's Reflectivity, Volcanic Activity etc. Energy consumption and energy audits; Trends in global carbon emissions;

Unit-III Energy Systems and Emissions

Technological change and energy consumption in industry; Role of energy crisis in climate change; Transition to renewable energy: options, costs and benefits; Emerging and future energy sources. Policy Response.

Unit-IV: Energy and Climate Protection

International approaches to cope up climate change: conventions (UNFCCC), Agreements (The Paris Agreement-2005), Protocols (Kyoto protocol etc); COP convention; Vienna Convention; Energy Charter Treaty; Climate change mitigation in developing countries; Public and Private sector role in climate change in India.

Suggested Readings:

1. McElroy, Michael B (2010): Energy: Perspectives, problems and Prospects, New York: Oxford University Press.
2. Elliot David (1997): 'Sustainable technology', Energy Society and environment. New York, Routledge.
3. Naomi Klien (2014): This Changes Everything: Capitalism versus Climate.
4. Edmond Mathez (2009): Climate Change: The Science of Global Warming and Our Energy Future. Columbia University Press.
6. Schmidt et al (2009): Climate Change: picturing the Science. WW Norton and Company

