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

Semester-wise Modules of the Four-Years Bachelors Programme (B.A/B.Sc. Hons. with Research) of the Department of Geography, Jamia Millia Islamia, New Delhi

1st Year B.A./B.Sc. (Hons.) Programme

Sem.	Major Core (DSC)	Minor Generic Elective (GE)	Multidisciplinary	Ability Enhance ment Compuls ory Course (AECC)	Skill Enhanceme nt Course (SEC)	Value Added Course (VAC)	Summer Internship	Research Project	Total Credits
I	**Geomorpholo gy** (Credit 4) 24GEOC101 DSC 2 - **Climatology & Oceanography** (Credit 4) 24GEOC102	**World Geography** (Credit 4) 24GEOM101	**Environmental issues and Management** (Credit 3) 24GEOT101	**General English** (Credit 2)	**Understanding Maps** (Credit 3) 24GEOS101	**Environmental Geography** (Credit 2) 24GEOV101			**22**
II	**Human Geography** (Credit 4) 24GEOC201 **Geography of India** (Credit 4) 24GEOC202	**Population Geography** (Credit 4) 24GEOM201	**Environmental Policies and Challenges** (Credit 3) 24GEOT201	**General English** (Credit 2)	**Cartographic Techniques** (Credit 3) 24GEOS201	**Digital Empowerment** (Credit 2) 24GEOV201			**22**
III	**Hydrology (Credit 4)** 24GEOC301 **Resource Geography** (Credit 4) 24GEOC301	**Bio-Geography** (Credit 4) 24GEOM301	**Social and Cultural Geography with special reference to India** (Credit 3) 24GEOT301	**Interpretation of socio-economic data** (Credit 2)		**Tourism Geography** (Credit 2) 24GEOV301			**19**

IV	**Economic Geography** (Credit 4) 24GEOC401 **Photogrammetry** (Credit 4) 24GEOC402 **Fundamentals of Remote Sensing** (Credit 4) 24GEOC403	**Agricultural Geography** (Credit 4) 24GEOM401		**Acquisition of Spatial data** (Credit 2)		**Conservation and Management of Resources** (Credit 2) 24GEOV401			**20**

Note:

- 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)

DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA

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

Course Name: Geomorphology
Course Type: Core Course
Course Code: 24GEOC101
Credits: 4
Total Marks: 100

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 Lerning.
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 Type: Core Course
Course Code: 24GEOC102
Credits: 4
Total Marks: 100

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.ShardaPustakBhawan, 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 Marrine Science. Brooks/Cole. New York
13. Garrison Tom. 2008. Essentials of Oceanography. Brooks/Cole. New York
14. Savindra Singh. 2013. Oceanography. PrayagPustakBhawan, 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 Type: Minor Course
Course Code: 24GEOM101
Credits: 4
Total Marks: 100

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 Lioyd, 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 Type: Skill Enhancement Course
Course Code: 24GEOS101
Credits: 3
Total Marks: 75

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 Type:** Value Added Course
Course Code: 24GEOV101 **Credits:** 2
Total Marks: 50

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: 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 (*First Semester*)

Course Name: Environmental Issues and Management
Course Type: Multi-disciplinary
Course Code: 24GEOT101
Credits: 3
Total Marks: 75

ENVIRONMENTAL ISSUES AND MANAGEMENT

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 Possiblism.

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 Type:** Core Course
Course Code: 24GEOC202 **Credits:** 4
Total Marks: 100

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, Bankok, 1993.
12. Sdhekhar.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 Type: Minor Course
Course Code: 24GEOM201
Credits: 4
Total Marks: 100

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 Georaphy-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. weeksJohn 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 Type: Multi-disciplinary
Course Code: 24GEOT201
Credits: 3
Total Marks: 75

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: Cartographic Techniques
Course Type: Skill Enhancement Course
Course Code: 24GEOS201
Credits: 3
Total Marks: 75

CARTOGRAPHIC TECHNIQUES

Unit - I: Fundamentals of Cartography

Definition and Scope of Cartography; Diagram: Bars- Simple, multiple and compound; Wheel Diagram-simple, compound and proportional circle

Unit II : Representation of Relief and Drainage

Methods of depiction of relief : hachures, hill shading, contours, and layer tinting; Contours and their profiles for slopes, valleys, waterfall, spur, knoll, saddle, escarpment, dissected plateau and overhanging cliff; Determination of slope, gradient, intervisibility and dead grounds; Stream order, Drainage density, Drainage texture, Drainage basin. Interpretation of topographic sheets of hilly, plateau and plain regions.

Unit III: Representation of Climatic Data

Representation of climatic data using line and bar graphs, isotherms, isobars and isohyets; Climographs and hythergraphs; Windroses Interpretation of Weather Charts of India for January and July.

Books Recommended:

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

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

7. https://www.cybersafeindia.in
8. https://ekumbh.aicte-india.org/
9. https://www.meity.gov.in/cyber-surakshit-bharat-programme
10. https://www.mha.gov.in/document/downloads/cyber-safety-handbook

DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA

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

Course Name: Hydrology
Course Type: Major Course
Course Code: 24GEOC301
Credits: 4
Total Marks: 100

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 (*Third Semester*)

Course Name: Resource Geography **Course Type:** Major Course
Course Code: 24GEOC302 **Credits:** 4
Total Marks: 100

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 Type:** Minor Course
Course Code: 24GEOM301 **Credits:** 4
Total Marks: 100

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; Argo-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

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: 24GEOA301 **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, Allahabad.

DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA

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

Course Name: Tourism Geography **Course Type:** Value - Added Course
Course Code: 24GEOV301 **Credits: 2**
Total Marks: 50

Tourism Geography

Unit-I Introduction

Definition and scope; Geographic resources of tourism: historic, climatic, cultural landscape and wildlife resources for tourism; Types of Tourism: cultural, coastal, religious, eco and adventure; Tourism as an industry and its future prospects.

Unit-II – Spatial Dimensions

Spatial dimensions of tourist attraction: national and international; Promotion of Tourism: Infrastructure and support system, accommodation, other facilities and amenities; Globalization and Tourism; Role of Government and other agencies in the promotion of tourism.

Unit-III Tourism- Global and local perspectives

A Geography of World Tourism, Worldwide destinations: The Geography of Travel and Tourism - Africa, Thailand and Malaysia, Gulf Countries, Southeast Asia, Egypt, Kenya, Uganda, North America, Australia, New Zeeland; Evolution, growth and development of tourism in India; Regional patterns of tourism in India; Social and economic dimension of tourism industry in India; Planning and Development of tourism in India.

Suggested Readings:

1. Bhatia A.K.: Tourism Development: Principles and Practices, Sterling publishers, New Delhi, 1996.
2. Bhatia, A.K. International Tourism-Fundamentals and Practices, Sterliing, New Delhi, 1991.
3. Hunter C and Green H: Tourism and the Environment: A Sustainable Relationship Routledge, London, 1995.
4. Milton D.: Geography of World Tourism Prentice Hall, New York, 1993.
5. Robinson, H. Geography of Tourism Macdonald and Evans, London, 1996

DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA

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

Course Name: Economic Geography
Course Type: Major Course
Course Code: 24GEOC401
Credits: 4
Total Marks: 100

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 Lerning 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 (*Fourth Semester*)

Course Name: Photogrammetry **Course Type:** Major Course
Course Code: 24GEOC402 **Credits:** 4
Total Marks: 100

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: Fundamentals of Remote Sensing **Course Type:** Major Course
Course Code: 24GEOC403 **Credits: 4**
Total Marks: 100

Fundamentals of Remote Sensing

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: Agricultural Geography **Course Type:** Minor Course
Course Code: 24GEOM401 **Credits: 4**
Total Marks: 100

Agricultural Geography

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: Acquisition of Spatial data
Course Type: Ability enhancement Course
Course Code: 24GEOA401
Credits: 2
Total Marks: 50

Acquisition of Spatial data

Unit -1: Introduction of Spatial Data and its preparation

Definition and types of Spatial data: Vector and Raster; Sources of Spatial data: Primary and Secondary; Georeferencing, Digitization and area calculation; topology errors; Concept of DBMS in Context of GIS; Spatial and non-spatial data link; Vector data analysis; Density mapping and Spatial Interpolation techniques.

Unit 2: Use of tools and application of spatial datasets

Spatial data analysis tools: Distance, condition, extraction, Basin creation using raster data; Map algebra for Indices calculation and reclassification of spatial datasets; Network analysis (OD cost matrix generation and optimum path tracing); Moran's I, Spatial autocorrelation and Geographically Weighted Regression (GWR), Hotspot Analysis; 3D visualization of spatial data and Image Classification.

Suggesting Readings:

1. Introduction to Geographical Information Systems - Chang, Kang-Tsung
2. Remote Sensing and GIS - Bhatta, B.
3. Mathematical Modeling in Geographical Information System, Global Positioning System and Digital Cartography - Sharma, H.S.
4. Frank, A. U. 2010. Scale is introduced in spatial datasets by observation processes. In Spatial Data Quality: From Process to Decisions, edited by. R. Devillers and H. Goodchild. 17-30. Boca Raton, FL, CRC Press.
5. G. Joseph (2005). Fundamentals of Remote sensing (Second Edition),Universities Press.
6. Bailey, Trevor C., and Anthony C. Gatrell. 1995. *Interactive Spatial Data Analysis*. England: Prentice Hall.
7. Jensen, J., Saalfeld, A., Broome, F., Cowen, D., Price, K., Ramsey, D., ... & Usery, E. L. (2004). Spatial data acquisition and integration. In *A research agenda for geographic information science* (pp. 17-60). CRC Press.
8. Frank, A. U. (1988). Requirements for a database management system for a GIS. *PHOTOGRAMM. ENG. REMOTE SENS.*, *54*(11), 1557-1564.

9. Fotheringham, A. S., Brunsdon, C., & Charlton, M. E. (1998). Geographically weighted regression: A natural evolution of the expansion method for spatial data analysis. Environment & Planning A, 30(11), 1905–1927.
10. Fotheringham, A. S., Brunsdon, C., & Charlton, M. E. (2002). Geographically Weighted Regression: The analysis of spatially varying relationship. New York: John Wiley.
11. Friedman, J. (2007). Reflections on place and place-making in the cities of China. International Journal of Urban and Regional Research, 31(2), 257–279.
12. Anselin, L., & Rey, S. (1991). Properties of tests for spatial dependence in linear regression models. Geographical Analysis, 23(2), 112–131.

DEPARTMENT OF GEOGRAPHY
JAMIA MILLIA ISLAMIA

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

Course Name: Conservation and Management of Resources **Course Type:** Value - Added Course
Course Code: 24GEOV401 **Credits:** 2
Total Marks: 50

Conservation and Management of Resources

Unit - I: Conservation 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.

Unit- II: Sustainable Management of Resources

Management methods of resources; Management of resources: air, water, soil, forest, minerals, human and biodiversity; 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), Sustainaility 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.