UNIVERSITY OF SARGODHA
OFFICE OF THE REGISTRAR
(ACAD BRANCH)

NOTIFICATION

On the recommendations of Academic Council made in its 22nd (3/2024) meeting held on 30.09.2024, the Syndicate in its 69th (1/2025) meeting held on 17.01.2025 approved the revised curricula of following programs for implementation w.e.f. Fall 2025:

i.	M.Phil in Geography	(Annex-'A')
ii.	MS in Geology	(Annex-'B')
iii.	Ph.D in Geology	(Annex-'C')

(WAQAR AHMAD)
Additional Registrar (General)

No. SU/Acad/25/288

Dated: 27.02.2025

Distribution:

- Chairman, Department of Earth Sciences
- Controller of Examinations
- Director Academics

C.C:

- Dean, Faculty of Sciences
- Director, QEC
- Additional Registrar (Affiliation & Registration)
- Secretary to the Vice-Chancellor
- PA to Registrar
- Notification File

Annex-'C'

1. **Nomenclature of the Program:**

M.Phil Geography

2. **Department Brief:**

The Department of Earth Sciences, Faculty of Sciences, University of Sargodha is a premier institution dedicated to imparting knowledge and fostering research in the field of Earth Sciences. Our well-qualified faculty is committed to create a vibrant learning environment that equips students with a deep understanding of the Earth's evolution and the sustainable management of its invaluable resources. With strong affiliations with national and international institutions, our department offers a comprehensive education that prepares students for diverse careers in private industry, public agencies and academia. It brings a wealth of knowledge and diverse research expertise to the students, providing the opportunity to learn from leading experts in Earth Sciences. The faculty members actively engage in research, publishing in renowned scientific journals and participating in national and international conferences. They are passionate about mentoring students and guiding them in their academic and research pursuits.

3. **Program Learning Objectives:**

Geography is the study of the earth, its structure, features, inhabitants and human environment interaction. The M.Phil. Geography programme helps students to study and investigate the earth and related phenomena. After completion of their degree, students will be able to understand the recent perspectives of Geography including man environment relationships, spatial variations resulting from physical and human activities and relationship of Geography with other disciplines of allied sciences. Students will be able to gain current knowledge and practical skills through theory, practical and field excursions.

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4. **Program Structure:**

Duration	Minimum 1.5-Years (3-Semesters), Maximum 4-Years (8-Semesters)
Entry Requirements:	MSc/BS in Geography with second division or CGPA 2.00 out of 4.00 + Departmental Test (at least 50% Marks)
Intra-disciplinary fields allowed for admission	BS/MSc in Geology, RS & GIS, Hydrology, Geoinformatics, Metrology +GRE-Subject test (50%)
Degree Completion Requirements:	Total Credit Hours of Course Work: 24 Total Credit Hours of Thesis 06 Total Credit Hours of Program: 30
Program Mode	Thesis Track

5. **List of Deficiency Courses of Level-6:** *(for intra-disciplinary admissions only)*

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1. ✓	GEOG-6192	Advanced Physical Geography	3(3-0)	Nil
2. ✓	GEOG– 6193	Advanced Human Geography	3(3-0)	Nil
3. ✓	GEOG - 6194	Pakistan: Geography, Demography and Economy	3(3-0)	Nil

6. **List of Mandatory/Compulsory/Core Curses:**

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1. ✓	GEOG-7101	Advanced Research Methods	3(3-0)	Nil
2. ✓	GEOG-7102	Techniques in Geo-informatics	3(3-0)	Nil
3. ✓	GEOG-7103	Advanced Quantitative Techniques	3(3-0)	Nil

7. **List of Elective Courses:**

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1. ✓	GEOG-7106	Digital Cartography	3(3-0)	Nil
2. ✓	GEOG-7107	Environmental Geography	3(3-0)	Nil
3. ✓	GEOG-7108	Hydro Geography	3(3-0)	Nil
4. ✓	GEOG-7109	Cultural Geography	3(3-0)	Nil
5. ✓	GEOG-7110	Geography of Natural Hazards and Disasters	3(3-0)	Nil

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6.	GEOG-7111	Industrial Geography	3(3-0)	Nil
7.	GEOG-7112	Medical Geography	3(3-0)	Nil
8.	GEOG-7113	Political Geography	3(3-0)	Nil
9.	GEOG-7114	Population Geography	3(3-0)	Nil
10.	GEOG-7115	Regional Planning & Development	3(3-0)	Nil
11.	GEOG-7116	Urban Geography	3(3-0)	Nil
12.	GEOG-7117	Digital Image Processing	3(3-0)	Nil
13.	GEOG-7118	Advanced techniques in GIS	3(3-0)	Nil
14.	GEOG-7119	Principles of Remote Sensing	3(3-0)	Nil
15.	GEOG-7120	Agricultural Geography	3(3-0)	Nil

8. Thesis:

01	GEOG-7190	Thesis	6	Nil

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Scheme of Studies

M.Phil Geography

Semester-I

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Deficiency-1*	GEOG-6192	Advanced Physical Geography	3(3-0)	Nil
Complusory-1	GEOG-7101	Advanced Research Methods	3(3-0)	Nil
Complusory-2	GEOG-7102	Techniques in Geo-informatics	3(3-0)	Nil
Elective-1	GEOG-71**	To be selected from Elective Courses List	3(3-0)	Nil
Elective-2	GEOG-71**	To be selected from Elective Courses List	3(3-0)	Nil

Semester-II

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Deficiency-2*	GEOG– 6193	Advanced Human Geography	3(3-0)	Nil
Complusory-3	GEOG-7103	Advanced Quantitative Techniques	3(3-0)	Nil
Elective-3	GEOG-71**	To be selected from Elective Courses List	3(3-0)	Nil
Elective-4	GEOG-71**	To be selected from Elective Courses List	3(3-0)	Nil
Elective-5	GEOG-71**	To be selected from Elective Courses List	3(3-0)	Nil

Semester-III-IV

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Deficiency-3*	GEOG - 6194	Pakistan: Geography, Demography and Economy	3(3-0)	Nil
	GEOG-7190	Thesis	6	Course Work Completion

Program Summary:

Category	Minimum No of Courses	Minimum No of Credit Hours
Deficiency Courses	3	9
Compulsory Courses	3	9
Elective Courses	5	15
Thesis		6

Note:

I. The Regulations related to M.Phil./M.Sc.(Hons) or equivalent approved by the Syndicate from time to time shall also be applicable.

II. Deficiency Courses are to be decided by Graduate Program Committee in start of each session.

III. Department can change the order of Core/Compulsory and Elective Courses as per availability of resources or demand.

IV. The department can change the course offering as per available resources but shall be uniform for one session

*** For Intra-disciplinary admitted candidates only**

**** From List of Elective course**

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GEOG-6192	Advanced Physical Geography	3(3-0)

Course Brief:

The primary objective of this comprehensive course is to equip students with fundamental knowledge of the diverse systems that constitute the physical landscape of our planet. Through a combination of theoretical understanding and practical exercises, participants will gain a deep and nuanced knowledge of the fundamental principles, modern advancements, and noteworthy regions of physical geography. The course will cover a wide range of topics, such as the structure and composition of the Earth, plate tectonics, climate change, weather patterns, erosion, landforms, and ecosystems. Students will learn about the interconnectivity and interdependence of these systems and how they shape the natural environment.

Course Learning Objectives:

Upon completion of this course, students will have a comprehensive understanding of the physical geography of Earth. They will skillfully integrate the latest developments in the field while defining its scope and main branches. Equipped with knowledge of the underlying processes that give rise to geological formations and the internal structure of the Earth, they will explore the forces and mechanisms that have shaped landforms. Additionally, students will be able to explain atmospheric phenomena, hydrological processes, erosion dynamics, seismic and volcanic activity, and their effects on the environment.

Course Contents:

1) Definition, scope and major branches
2) Recent advancements in Physical Geography
3) Internal structure of earth
    i) Rocks–origin, formation and types: Igneous, Sedimentary and Metamorphic Rocks
4) Geomorphic Processes and Agents:
    i) Endogenic Forces and Exogenic Processes; Landforms; Running Water; Glacier; Wind etc.
5) Earthquakes and volcanic activity, folding and faulting
6) Weathering, mass wasting, cycle of erosion, erosion and deposition
7) Atmosphere:
    i) Composition and structure of atmosphere, atmospheric temperature and pressure, global circulation, atmospheric moisture and precipitation, air masses and fronts, cyclones and other disturbances
8) Hydrosphere:
    i) Hydrological cycle, Ocean composition, temperature and salinity of ocean water, Movements of the ocean water; waves, currents and tides.
9) Bio-geography:
    i) Bio-diversification and ecological equilibrium, Degradation of Soils and ground water, watershed management.

Recommended Texts:

1. Strahler, A. (2013).*Introduction to physical geography*. New York: John Wiley & Sons.
2. Thornbury, W. D. (2004).*Principles of geomorphology*. New Jersey: John Willy &Sons.

Suggested Readings:

1. Strahlar, A. N., &Strahlar, A. H. (2004).*Physical environment*. New York: John Wiley & Sons.
2. Stringer, E. T. (2004).*Modern physical geography*. New York: John Wiley & Sons.

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GEOG– 6193	Advanced Human Geography	3(3-0)

Course Brief:

This course provides an introduction to Human Geography the 2nd major branch of Geography for the candidates from different disciplines. The major thrust is on the study of human societies in their relation to the habitat or environment. Dealing with the spatial distribution of societies, human geography covers a very wide field or its scope is enormous. It embraces the study of human races; the growth, distribution and density of populations of the various parts of the world, their demographic attributes and migration patterns; and physical and cultural differences between human groups and economic activities.

Course Learning Objective:

This course covers the relationship between man and his natural environment, and the way in which his activities are distributed. Human geography also takes into account the mosaic of culture, language, religion, customs and traditions; types and patterns of rural settlements, the site, size, growth and functions of urban settlements, and the functional classification of towns. The study of spatial distribution of economic activities, industries, trade, and modes of transportations and communications as influenced by the physical environment are also the important topics of human geography.

Course Contents:

1. Introduction
2. Recent approaches in Human Geography
3. Population and its characteristics and population distribution
4. Population structure and composition
5. Population dynamics (fertility, mortality, migration etc.)
6. Detailed study of socio-cultural change
7. Economic activities: Primary, Secondary, Tertiary, Quarternary and Quinary.
8. Settlements: Theories and types of human settlements
9. World political systems
10. Human environment interaction

Recommended Texts:

1. Fourberg,H., Murphy, B.A., De blij. H.J. (200p).*Human Geography: People, Place and Culture.* New York: John Wiley & Sons.
2. Becker, A. & Secker. (2002).*Human geography: culture, society, and space.* New Jersey: John Wiley and Sons.

Suggested Readings:

1. Benko, G. & Shorhmay. (2004). *Human geography: a history for the 21st century.* London: Hodder Arnold.
2. De.blij, H. J. (2002).*Human geography: culture, society, and space.* New Jersey. John Wiley and Sons.
3. Cloke, P. &Crang, P. (2005).*Introducing human geographies,* (2nd ed.). London: Hodder Arnold.

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GEOG - 6194	Pakistan: Geography, Demography and Economy	3(3-0)

Course Brief:

This course attempts to impart knowledge about the relationship between man and physical, socio-economic and cultural environment with special reference to Pakistan. It includes the spatial study of land, population and their culture, human settlements, natural resources, economic activities and other related geographical phenomena in Pakistan.

Course Learning Objectives:

As the world becomes more interrelated and interdependent through technological advances, it is increasingly important to understand the physical and cultural differences of other places. Studying of Pakistan geography also opens a link to understanding the history of one's own culture, as well as that of others. An understanding of geography also allows one to make smart choices when dealing with issues regarding the relationship of society to the physical environment.

Course Contents:

1. Geo-political importance of Pakistan
2. Administrative setup
3. Land and Physical Environment
4. Climate and climatic regions
5. Soils and vegetation
6. Population characteristics: structure, composition and distribution
7. Urbanization
8. Agriculture (crops and livestock)
9. Irrigation
10. Power and mineral resources
11. Industries
12. Trade and Tourism
13. Transport and Communication
14. Major challenges of Pakistan
15. Water, power, security and environmental issues

Recommended Texts:

1. Khan, F. K. (2015). *Pakistan: Geography, Economy and People.* Karachi: Oxford University Press.
2. Ahmad, K. S. (2000). *Geography of Pakistan.* Karachi: Oxford University Press.

Suggested Readings:

1. Burkey, J. S. (1991). *Pakistan the continuing search for nationhood.*Oxford: Western Press Oxford.
2. Davidson, A. P. & Ahmad, M. (2003). *Privatization and the crisis of agricultural extension: the case of pakistan, king's soas studies in development geography.* New Delhi: Ashgate Publishing.

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GEOG - 7101	Advanced Research Methods	3(3-0)

Course Brief:

Advanced Research Methods course teaches students how to conduct in-depth geographical research using scientific methods. Students learn to create research objectives, manage methodologies, analyze data, and evaluate research findings. Writing and critical thinking abilities are emphasized for successful geography research projects.

Learning outcomes

Advanced Research Methods teaches students to create precise research objectives and questions, choose suitable methods, analyze data effectively, and assess findings through various research types.

Contents

1. Introduction
2. Research Problems and Plans
3. Types of Research
4. Formulating Research Objectives
5. Research Questions
6. Managing a Research: Selecting Research Methods
7. Data Analysis and Interpretation
8. Research Evaluation and Writing

Recommended Texts

1. Blaxter, L., Christina, H. & Malcolm, T. (2010). *How to research*. New Delhi: McGraw Hill.
2. Bordens, K. S. & Bruce B. A. (2011). *Research design and methods*. Singapore: McGraw Hill.

Suggested Readings

1. Clifford, N. (Ed.). (2012). *Key methods in geography*. Los Angeles: SAGE.
2. Cohen, L., Lawrence, M. & Keith, M. (2011). *Research methods in education*. London: Taylor & Francis Group.
3. Gay, L. R. (2012). *Educational research: competencies for analysis and application*. Paris: Macmillan Publishing Company.

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GEOG – 7102	Techniques in Geo-informatics	3(3-0)

Course Brief:

Many fields benefit from geoinformatics, including urban planning and land use management, in-car navigation systems, virtual globes, public health, local and national gazetteer management, environmental modeling and analysis, military, transport network planning and management, agriculture, meteorology and climate change, oceanography and coupled ocean and atmosphere modelling, business location planning, architecture and archeological reconstruction, telecommunications, criminology and crime simulation, aviation, biodiversity conservation and maritime transport. The importance of the spatial dimension in assessing, monitoring and modelling various issues and problems related to sustainable management of natural resources is recognized all over the world.

Learning Out come

The goal of Techniques in Geo-informatics is to teach students how to use geoinformatics tools for activities such as land use management, agriculture, transportation network design, urban planning, meteorology, and biodiversity protection. They will be able to make informed decisions about sustainable resource management at local, regional, and global levels.

Contents

1. Introduction
2. Concept of Electromagnetic Radiation
3. Concept of GIS Data
4. Basic concepts
5. Data types
6. Creating Database, GIS data Inputs
7. Data Editing
8. Integration of RS and GIS datasets
9. Urban growth
10. Environmental management, Hazards
11. Land-use Planning
12. Wildlife
13. RS and GIS scenario in Pakistan context
14. Vast areas where RS and GIS is currently practicing

Recommended Texts

1. Aber, J. S., Marzol, f. I., & Ries, J. (2010). *Small-format aerial photography: principles, techniques and geoscience applications.* Amsterdam: Elsevier.
2. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to remote sensing.* New York: Guilford Press.

Suggested Readings

1. Clarke, K. (2004). *Getting started with geographic information system.* New York: Prentice Hall.
2. Heywood, I., Cornelius, S. & Carver, S. (2011). *An introduction to geographical information system.* New Jersey: Prentice Hall.
3. Jensen, J. R. (2011). *Remote sensing of the environment: an earth resource perspective.* New Jersey: Prentice Hall.

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GEOG - 7103	Advanced Quantitative Techniques	3(3-0)

Course Brief:

To train students in collection, analysis, interpretation and presentation of quantitative spatial data and to enable them to organize and conduct independent research. To use database software for the analysis of both Spatial and Temporal data. Quantitative techniques are the techniques that are concerned with collection, organization, presentation, analysis and interpretation of data.

Course Learning Objectives:

The quantitative techniques in geography are a recent development. The hard numbers behind any good research project are called quantitative data. Quantitative data is the language of science. It uses mathematical models, theories, and hypotheses. Quantitative data and qualitative data, in which you observe the non-numerical qualities of your subject, go hand-in-hand.

Contents

1. Introduction
2. Measures of Numerical Distributions
3. Time Series
4. Samples and Sampling
5. The Relationship
6. The Trends
7. Multiple Regression and Correlation
8. Multivariate Analysis
9. Principal components analysis
10. Factor analysis
11. Discriminate analysis
12. Cluster observation
13. Cluster variables
14. Cluster K.means

Recommended Texts

1. Gregory, S. (2005). *Statistical methods and the geographer*. London: Longman.
2. Levin, J. (2006). *Elementary statistics in social research*. New Dehli: Pearson.

Suggested Readings

1. Mckillup, S. & Melinda D. D. (2010). *Geostatistics explained.* Cambridge: Cambridge University press.
2. Taylor, P. J. (2000). *Quantitative methods in geography*. Boston: Houghton Mifflin.
3. Walford, N. (2011). *Practical statistics for geographers and earth science.* Singapore: Wiley-Blackwell.

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GEOG - 7106	Digital Cartography	3(3-0)

Course Brief:

Cartography or mapmaking is the study and practice of making representations of the Earth on a flat surface. The discipline of cartography combines science, aesthetics, and technical ability to create a balanced and readable representation that is capable of communicating information effectively and quickly.

Course Learning Objectives:

Cartography is a complex, an ever-changing field, but at the center of it is the map-making process. Viewed in the broadest sense, this process includes everything from the gathering, evaluation and processing of source data, through the intellectual and graphical design of the map, to the drawing and reproduction of the final document. As such, it is a unique mixture of science, art and technology and calls for a variety of in-depth knowledge and skills on the part of the cartographer.

Contents

1. Classification of maps based on scale
2. Function and subject matter
3. Basic Mapping processes.
4. Shape & size of earth
5. Locational system
6. Shape refinements.
7. Geodetic control survey
8. Latitude, longitude determination.
9. Map Projections
10. Different types of map projections
11. Conformal, Equal area, Azimuthal, Polyconic, Universal Transverse Mercator
12. Cartographic Design
13. Colour/pattern creation and specification
14. Maps and graphs
15. Cartographic Tools
16. Advanced Mapping Environment
17. Computer Mapping
18. Multimedia Techniques in Cartography

Recommended Texts

1. Ahmad, Q, S. (2000). *Simple map projections*. Lahore: Publishers United.
2. Brewer, C.A. (2005). *Designing better maps: a guide for gis users*. Redlands: ESRI Press.
3. Brewer, C.A. (2008). *Designed maps: a sourcebook for GIS users*. Redlands: ESRI Press.

Suggested Readings

1. Dent, B. D. (1999). *Cartography: thematic map design*. Boston: WCB/McGraw-Hill.
2. Krygier, J. & Wood, D. (2005). *Making maps: a visual guide to map design for GIS*. New York: The Guilford Press.
3. Peterson, G. N. (2009). *GIS cartography: a guide to effective map design*. New York: CRC Press Taylor and Francis Group.

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GEOG - 7107	Environmental Geography	3(3-0)

Course Brief:
Environmental Geography, one of the most traditional parts of the discipline of Geography, encompasses natural science, social science, and humanistic understandings of the Earth's environment. Environmental Geographers study the complex relationships between humans and the natural environment over time and through space.

Course Learning Objectives:

This course will provide a historical, geographical, and humanistic foundation for understanding the environment and the plethora of environmental issues that confront us at the beginning of this century. It is a major aim of this course to produce environmentally aware students and to equip them with skills to enable them to become future decision-makers on environmental matters in whatever field they wish to pursue in the future. By studying this course students will be able to recognize what the issues are, and to view them from a geographic perspective. They will recognize the responsibilities they have in relation to other people, the environment, and sustainability, and there will be opportunities to initiate personal action.

Contents

1. Evolution of Environmental Studies in Geography
2. Comparative Advantage of Geography
3. Concept of environmental management
4. Environment and Man interaction, Ecosystem, natural resources
5. Important Cycles
6. Population explosion, The human impact on the environment
7. Environmental hazards, Types of Hazards
8. Major Environmental hazards and Problems in Pakistan: Floods, Earthquake, Tsunami, Cyclones, Landslides, Droughts, Deforestation and Desertification
9. Water-logging and Salinity
10. Soil Erosion
11. Global Warming and ozone depletion
12. Environmental Pollution , Waste Management, Control and Mitigation Measures, Technology, awareness, Legislation, Ethics
13. Pakistan Environmental Act
14. National Conservation Strategy
15. National Environmental Quality Standard

Recommended Texts

1. Arms, K. (2001). *Environmental science*. Philadelphia: Asunders College Publishing.
2. Basak, A. (2009). *Environmental studies*. New Delhi: Pearson.

Suggested Readings

1. Botkin, D. B. & Edward A. K. (2012). *Environmental science*. Hoboken: John Wiley & Sons.
2. Burton, I. R., W. Kates& Gilbert. F. W. (2000). *The environment as hazard*. Karachi. Oxford University Press.
3. Cunningham, W. P. (2007). *Environmental science: a global concern*. Boston: McGraw-Hill Higher Education.

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GEOG - 7108	Hydro Geography	3(3-0)

Course Brief:

It describes advanced knowledge about Water resources, water resource management, Hydrology, distribution and availability of water. This course provides a basic introduction to hydrologic processes, including fundamentals of hydrology, rainfall-runoff modeling, hydraulic processes (including both pressurized pipe flow and open channel flow), and hydrologic frequency analysis.

Course Learning Objectives:

Hydrologic frequency analysis was applied in the computation of design flows and in the analysis and design of hydraulic systems such as pipe networks and storm water management systems. Computational laboratory sessions (including geographic information systems and simulation models) and experimental laboratory sessions reinforce lectures and provide hands-on learning opportunities. By the end of this course, students should be able to apply standard techniques, computational tools, and data used by engineers in conducting hydrologic analysis.

Contents

1. Introduction
2. Hydrological Cycle and Water Balance: Water Reservoirs, Hydrological Cycle, Water Balance
3. Precipitation and Rainfall
4. Runoff: Factor affecting the Runoff, Runoff Cycle and Phases of Runoff, Measurement of Runoff
5. Ground Water
6. Floods: Causes and Seasonal Distribution of Floods, Flood Protection and Planning, Geographical Distribution of Floods
7. Glacial Water: Glacial Nourishment and Wattage, Glacial Runoff, Glacial Flow, Response of Glacier to Climatic Changes
8. Droughts: Extent and Distribution of Droughts, Drought Severity, Frequency and Duration, Hydrological Relations in Draughts
9. Lakes: Origin and Diversity, Hydrological Cycle and Water Balance Lakes, Geographical Distribution

Recommended Texts

1. Raghunath, H. M. (2006). *Hydrology: principles, analysis and design*. Amsterdam: New Age International.
2. Ward, R.C. & Robinson, M. (2000). *Principles of hydrology*. London: McGraw Hill.

Suggested Readings

1. Bittinger, M. W. (2000). *Water resources, use, and management.* Proceedings of a symposium held at Canberra. Edwin S. (Hill, Eds). Cambridge: Cambridge University Press.
2. Meinzer, O.E. (2000). *Hydrology.* New York: McGraw Hill.
3. Chow, V. T. (2000). *A handbook of applied hydrology.* New York: McGraw Hill.

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GEOG - 7109	Cultural Geography	3(3-0)

Course Brief:

It describes advanced knowledge about Water resources, water resource management, Hydrology, distribution and availability of water. This course provides a basic introduction to hydrologic processes, including fundamentals of hydrology, rainfall-runoff modeling, hydraulic processes (including both pressurized pipe flow and open channel flow), and hydrologic frequency analysis.

Course Learning Objectives:

Hydrologic frequency analysis was applied in the computation of design flows and in the analysis and design of hydraulic systems such as pipe networks and storm water management systems. Computational laboratory sessions (including geographic information systems and simulation models) and experimental laboratory sessions reinforce lectures and provide hands-on learning opportunities. By the end of this course, students should be able to apply standard techniques, computational tools, and data used by engineers in conducting hydrologic analysis.

Contents

1. Introduction
2. Basic themes of cultural Geography
3. Cultural History
4. Paleolithic Age: Hunting & Gathering Culture
5. Neolithic Age: Agricultural World Revolution
6. Revolution & Urbanization
7. Detailed Study of Stages of Social Cultural Change
8. Geo-Cultural Study of the following
9. Religion
10. Language

Recommended Texts

1. Fouberg, E. H., Murphy, A. B., & De Blij, H. J. (2009). *Human geography: people, place, and culture.* New York: John Wiley & Sons.
2. Terry G. J. Lester R. (2000). *Human mosaic.* New York: Harper Collins Publishers.

Suggested Readings

1. Atkinson, D., Jackson, P., Sibley, D., &Washbourne, N., (2005). *Cultural geography: A critical dictionary of key ideas.* IB Tauris.
2. Anderson, K., Domosh, M., Pile, S., & Thrift, N., (2002). *Handbook of cultural geography.* Singapore: Sage.
3. Horton, J., &Kraftl, P., (2013). *Cultural geographies: An introduction.* London: Routledge.

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GEOG - 7110	Geography of Natural Hazards and Disasters	3(3-0)

Course Brief:

This course covers the mitigation concepts, implementation approaches planning and types of Hazards. It is a multidisciplinary research oriented subject for planning and development. This is a course on applied hazard mitigation, but because it is a graduate level course, the focus will not be only on the fundamentals of hazard mitigation but on the fundamentals and their application. Students have had some introduction to hazard mitigation through NHDM. The application aspect of this course addresses the relationship of hazards and their behaviors which cause disasters and how local, state, and federal emergency management agencies can mitigate the potential threats.

Course Learning Objectives:

Hazard mitigation is actually hazards management, much like emergency preparedness, response, and recovery have to with disaster management. Thus, in emergency management we deal with both hazards and disaster management. The approach used in this present course is to address hazards management or the management of hazards so that future disaster impacts will be reduced or eliminated.

Contents

1. The Concept
2. The Nature of the Phenomena
3. Dynamics of Potentially Disastrous Natural Hazards
4. Impact of Natural Hazards and Likely Disasters
5. Scale
6. Risks
7. Vulnerability
8. The Disaster Management Cycle
9. Application of RS, GIS, GPS Tools in the Management of following Natural Hazards / Disasters
10. Flood
11. Earthquake
12. Cyclones
13. Rainfall
14. Efficacy of the Integrated Development Planning and Natural Hazards/ Disasters

Recommended Texts

1. Bryant, E. (2005). *Natural hazards*. Cambridge: Cambridge University Press.
2. Cochrane, M.A. (2009). *Tropical fire ecology: climate change, land use and ecosystem dynamics.* Springer: Praxis Publishing.

Suggested Readings

1. Ghosh, G.K. (2006). *Disaster Management*. New Delhi: A.P.H Publishing Corporation.
2. Pirarizy, A.A. (2002). *Environmental Geography and Natural Hazards*. New Delhi: A.P.H Publishing Corporation.
3. Smith, K. (2004). *Environmental Hazards. Assessing Risk and Reducing Disaster*. London: Routledge.

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GEOG - 7111	Industrial Geography	3(3-0)

Course Brief:

The term "industrial" includes those activities by which man changes the form or nature of raw materials, converting them into more useful products.The course focuses on explanations of factory location, the role of location in corporate strategies and the geographical structure of production systems, including industrial districts. Particular attention is paid to the organizational structure of the economy, especially the dominant role played by multinational firms (MNCs), and the forces that shape the agglomeration and dispersal of activity. These transforming operations are conducted in factories, to which are brought raw materials from various source regions and from which go finished products to diverse market regions. Factories which characterize industrial regions may be interrelated: some may supply semi-finished items to other factories; others may be branch plants; and still others may have a service relationship, such as a power plant, which supplies electrical energy to other factories. A relationship also exists between factories and non-factory elements

Learning outcomes

This course aims to provide students with a comprehensive understanding of the dynamics and structure of industrial activity. Students will learn to evaluate variables affecting factory location choices, geographical factors in business strategy, and production processes. The course focuses on multinational corporations, industrial concentration, and relationships between manufacturers, suppliers, market areas, and infrastructure. Students will also gain insights into the impact of industrial development on economic, social, and environmental systems.

Contents

1. Introduction to Industrial Geography
2. Frameworks of Industrial Geography
3. The Industrial Revolution
4. The Evolution of manufacturing system
5. The differential space economy, World trade in manufacturing goods
6. Key concepts & Theories in Industrial Geography
7. Industry Dynamics
8. Industrial Trends In Asia
9. Trade competition
10. Technological capabilities & competitiveness
11. Clustering of Industrial activities
12. Future prospects
13. Study of Major Industries of the world
14. Wheat & Rice- The world's great foodstuff
15. The textile and clothing Industries

Recommended Texts

1. Alexanderson, G. (2000). *Geography of manufacturing*. Englewood Cliffs: Prentice Hall Publications.
2. Altaf, Z. (2000). *Entrepreneurship in the third world risk and uncertainty in industry in Pakistan.* London: Croom Helm, Ltd.

Suggested Readings

1. Chapman, K. & Walker, D.F. (1991). Industrial Location. (2nded.). Oxford: Wiley Eastern Ltd.
2. Emery, J.S. & Shaw, J.H. (2000). Cities and Industries. Milton: Jacaranda Press.
3. Hayter, R. (2000). *The Dynamics of Industrial Location*. New York: John Wiley & Sons

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GEOG - 7112	Medical Geography	3(3-0)

Course Brief:

Medical geography is an important "new" area of health research that is a hybrid between geography and medicine dealing with the geographic aspects of health and healthcare. Medical geography studies the effects of locale and climate upon health. It aims to improve the understanding of the various factors which affect the health of populations and hence individuals. It is also called health geographics. Focuses on the design of GIS-based models to address health and healthcare issues.

Course Learning Objectives:

Topics include a conceptual framework, landscape epidemiology models, disease diffusion models, health accessibility, human health behavior and location-allocation of health services. Laboratory section provides hands-on experience applying these models with GIS tools.

Contents

1. Introduction to Medical Geography:
2. Definitions, themes, concepts, Nature & scope of Medical Geography
3. The Historical Development of Medical Geography
4. The status of Medical Geography.
5. Factors inflecting the Patterns of Health & Disease:
6. Geographical Factors.
7. Physical Factors / Environmental Factors.
8. Cultural Factors.
9. Socio – Economic & Political Factors.
10. Patterns & Processes of Health & Disease:
11. Spatial variations in health & welfare patterns.
12. Role of Geography in exploring the impacts of diseases.
13. Models in Medical Geography
14. Epidemiological Transition
15. Health & inequalities
16. Inverse care law.
17. Global Patterns of health & Disease.
18. Global Eradication of disease.
19. Progress in Medical Geography:
20. Recent Issues & Developments in Medical Geography.
21. GIS, Remote Sensing & Health studies.
22. Changing Societies & future Health care.
23. Geography, Health care & Planning.

Recommended Texts

1. Lloyd, J. (2002). *Health & welfare*. London: Holder & Stoughton.
2. Izhar, F. (2004). *Geography & Health: A study in medical Geography.* New Delhi: A.P.H. Publishing Corporation.

Suggested Readings

1. Leninan, J. & Fletcher, W.W. (2000). *Health & the environment* (1st ed.). Glasgow: Blacker & Sons Ltd.
2. Lloyd, J. (2002). *Health & welfare,* Holder & Stoughton London.

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GEOG - 7113	Political Geography	3(3-0)

Course Brief:

Political geography is concerned with the study of both the spatially uneven outcomes of political processes and the ways in which political processes are themselves affected by spatial structures. In this course, we will survey Political Geography, a subfield of Human Geography whichfocuses on questions of space and power and the interconnections of geography and politics.All politics are geographical, from the spatial arrangement of local governments to theterritorial basis of international trade. We will explore how politics works with a concern forwhere political impacts occur at a variety of geographical scales (from the international to thelocal) while also considering how geographical factors impact political actions.

Course Learning Objectives:

This studies examine the geography of various formal institutions and practices of politics as well as the informal politics of everyday life within places. In short, we'll explore how political power makes geographies and how, in turn, geography may be said to make politics.

Contents

1. Nature and objectives of Political Geography, Definition and development of political geographic thought.
2. A critical examination of the following:
3. Concept of environmental relationship in political geography.
4. The concept of geopolitics its development and short-comings
5. National deterministic theories of Germans and French possibilities.
6. State as a Politico-geographic Phenomenon:
7. Concept of the state and its classification. Chief political-geographic characteristics of states.
8. Hierarchy of political area.

Recommended Texts

1. Jones, M., Jones, R., Woods, M., Whitehead, M., Dixon, D., & Hannah, M. (2014). *An introduction to political geography: space, place and politics*. London: Routledge.
2. Kruys, B. G. G. (2002). Controlling land borders: A comparison of the United States of America, Germany and South Africa. *Strategic review for southern Africa*, *24*(2), 114.

Suggested Readings

1. Agnew, J. (1997). *Political geography: a reader.* London: Arnold.
2. Bakis, H. (1995). Communication and Political Geography in a Changing World' *Revue Internationale de Science Politique, 16* (3). 219–311.
3. Williams, N. (2009). *Border Politics: The limits of sovereign power: the limits of sovereign power.* Edinburgh: Edinburgh University Press.

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GEOG - 7114	Population Geography	3(3-0)

Course Brief:

This course introduces population geography to advanced undergraduate students, and graduate students. We will examine how and why aspects of population have been understood as 'problems' in different and times. he syllabus coverts the major concepts and basic tools of demography; key geographical and historical processes of population change such as fertility, mortality and migration; and the socio-economic, political, and environmental causes and consequences of population dynamics in different world regions and over time. The population dynamics are discussed in a way that incorporates economic, political, cultural and environmental issues.

Course Learning Objectives:

To develop this critical geographic approach to population issues, we will places examine trends in population, population patterns at several scales (global, national, urban) and the population processes (fertility, mortality, migration) that create them. Further, we will investigate how population processes are shaped by, and engender, larger processes of political, environmental, urban, economic, and cultural change.

Contents

1. Introduction
2. Population theories
3. Sources and methods of population data collection and associated problems
4. Population distribution and density
5. Urban and rural population
6. Population composition
7. Gender composition, age structure, marital status, families and households, languages, religions, ethnic groups etc.
8. Population dynamics
9. Patterns of fecundity and fertility
10. Morbidity and mortality
11. Migration and its types
12. Demographic transition
13. Population growth and change
14. Population Projections

Recommended Texts

1. Newbold, K. B. (2017). *Population geography: tools and issues*. Toronto: Rowman& Littlefield.
2. Ardagh, M. (2013).*Textbook of population geography*.New Delhi: Random Exports.

Suggested Readings

1. John. I. C. (1997). *Population geography*.Toronto: Rowman& Littlefield.
2. Majid, H. (1994). *Population geography.* Karachi: Anmol Publications
3. Polunin, N. (1998). *Population and global security.* Cambridge: Cambridge University Press.

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GEOG - 7115	Regional Planning and Development	3(3-0)

Course Brief:

Regional planning deals with the efficient placement of land-use activities, infrastructure, and settlement growth across a larger area of land than an individual city or town. Regional planning is a sub-field of urban planning as it relates land use practices on a broader scale. This course will explore and analyze the various aspects, concepts and approaches of urban geography.

Course Learning Objectives:

The course will cover topics such as historic and contemporary urban development; spatial dimensions of the city; social and economic patterns; images of the city; inequality and the development of urban built environment. It also includes formulating laws that will guide the efficient planning and management of such said regions. Regions require various land uses; protection of farmland, cities, industrial space, transportation hubs and infrastructure, military bases, and wilderness. Regional planning is the science of efficient placement of infrastructure and zoning for the sustainable growth of a region.

Contents

1. Principles and Scope of Planning and Development
2. Planning: A Geographer's View, ii. Planning Processes
3. Planning as an Activity
4. Objectives in Planning
5. Objectives of Regional Development Efforts.
6. Implications of Regional Development:
7. Defining Regions,
8. Resources and Planning:
9. The Resource Base.
10. Resource Evaluation.
11. Utilization of Resources for Planning and Development.
12. Urban and Regional Planning:
13. Urban Growth Patterns.
14. Impact of Industrialization.
15. Planning for Cities and City Regions.
16. Rural Planning:Agricultural Planning and Rural Development.
17. The Human Factor in Agricultural Development.

Recommended Texts

1. Hall, P. (2000). *Urban and regional planning* (2nd ed.). London: Allen &Unwin.
2. Hudson, R. & Lewis J.R. (2000). *Regional planning in Europe*. London: Pion Ltd.

Suggested Readings

1. Birmingham, W., & Ford, A.G., (2000). *Planning and growth in rich and poor countries.* London: George Allen and Unwin Ltd.
2. Cox, K. R. (2000). *Location and public problems.* Oxford: Basil Black-Well.
3. Frey H. (1999). *Designing the city towards a more sustainable Urban Form.* London: Routledge.

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GEOG - 7116	Urban Geography	3(3-0)

Course Brief:

This course explores the setting in which more than half of the world's people live--the city. Cities are the largest human artifacts, but how do they emerge and evolve? What are the similarities and differences between cities? Why is the Central Business District of some cities thriving while others decline? These and many other questions are examined by urban geographers. This course will explore and analyze the various aspects, concepts and approaches of urban geography. The course will cover topics such as historic and contemporary urban development; spatial dimensions of the city; social and economic patterns; images of the city; inequality and the development of urban built environment.Throughout history, cities have been the centers of economic, political, and cultural life. Further, many of the critical issues of our time--social polarization, economic restructuring, environmental degradation, and poverty--are concentrated in urban areas.

Course Learning Objectives:

This course explores the relationships among cities in a global urban system as well as the internal spatial arrangement of cities. It asks questions about how people structure the spaces of cities as well as about how people's lives are affected by the ways cities are structured.

Contents

1. Origin of towns.
2. Site and situation concept.
3. Process of urbanization in the world.
4. Urban function, economic base of urban centers.
5. Formal and functional classification of towns
6. Towns as central place
7. Urban hinterland.
8. Urban structure-different theories
9. Hierarchy of settlements-city size distribution
10. Rank size Rule
11. Law of primate city.
12. Urban expansion, metropolitan decentralization
13. Rural urban fringe-urban social life.
14. Concept and principles of Planning.
15. History of Town Planning-ancient and medieval Modern Planning-urban development urban renewal neighbourhood planning.
16. A study of the process of urbanization in Pakistan.
17. Urban Slums

Recommended Texts

1. Pacione, M. (2013). *Urban geography: A global perspective*. Routledge.
2. Wheeler, J. O., & Holloway, S. R. (2004). *Urban geography*. John Wiley & Sons Inc.

Suggested Readings

1. Douglas, I., Goode, D., Houck, M., & Wang, R. (Eds.). (2010). *Handbook of urban ecology*. Routledge.
2. Mayer H.M. & Kohn C.F. (2000). *Readings in urban geography*. Chicago: University of Chicago Press.

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GEOG - 7117	Digital Image Processing	3(3-0)

Course Brief:

It describes knowledge about knowledge about Digital Image processing (DIP) and its practical implementation. To produce students, that has applicable knowledge about basic tools of image processing and sensor's system. The course aims to equip students with overview of digital image processing including visual perception, image formation, spatial transformations, image enhancement, color image representation and processing, edge detection, image segmentation, and morphological image processing. Since 1964 the advent of large-scale digital computers and the space program have made digital image processing one of the most rapidly growing fields in electrical engineering.

Course Learning Objectives:

Image processing has found much more wide applications not only in the space program, but also in the areas such as medicine, biology, industrial automation, astronomy, law enforcement, defense, intelligence. With the progress made in multimedia these days, digital image processing finds more wide applications. It has become an indispensable part of our digital age.

Contents

1. Introduction
2. Image pre-processing
3. Contrast Manipulation
4. Level slicing
5. Contrast stretching: linear or Non Linear
6. Spatial Texture Manipulation
7. Spatial Filtering
8. Directional and Gradient Filters
9. Edge Enhancement
10. Fourier Analysis

Recommended Texts

1. Lilles T. M. & Kiefer, R. W. (2004).*Remote sensing and image interpretation.* New York: John Wiley & Sons.
2. Campbell, J. B. &Wynne, R. H. (2011).*Introduction to remote sensing.* New York: Guilford Press.

Suggested Readings

1. Lo, C. P. (2000). *Applied remote sensing.* Essex: Longman.
2. ITC (2004). *Principles of remote sensing.* ITC Educational Textbook Series. Enschede, The Netherlands.
3. Muralikrishna, I. V. (1992). *Remote sensing applications and geographic information systems.* New Delhi: McGraw Hill.

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GEOG - 7118	Advanced Techniques in Geographical Information Systems	3(3-0)

Course Brief:

The course aims to equip students with an understanding of GIS, evolution and applications of spatial data. In this class, students will be introduced to the study and design of maps, primarily through the application of a specialized computer mapping software program known as a Geographic Information System (GIS). GIS is a map-based computer decision support system that allows for the investigation of geographic data relationships. People that are trained in GIS are in high demand today, both in government and private industry. The lecture sessions in this class will focus primarily on GIS-based mapmaking techniques, including map design, symbology, map coordinates and georeferencing systems. Students will cover many important aspects of mapmaking, including map data collection and processing, field methods and GPS, cartographic communication, topographic map reading and analysis, and qualitative and quantitative mapping techniques.

Contents

1. Introduction to GIS
2. Spatial Data
3. GIS Data Structures
4. Spatial Data Modeling
5. Attribute Data Management
6. Spatial Data Input and Editing
7. Spatial Data Analysis
8. GIS Output
9. GIS Project Design and Management
10. Problem identification
11. Designing a data model
12. Project management
13. Implementation problems
14. Project evaluation

Recommended Texts

1. Chang, K. (2006). *Introduction to geographic information systems*. Boston: McGraw-Hill Higher Education .
2. Demers, M.N. (2002). *Fundamentals of geographic information systems*. New York: John Wiley & Sons.

Suggested Readings

1. Yeung., Lo, C.P. &Lal, A. K. (2003). *Concepts and techniques of geographic information system.* New Dehli: Prentice Hall.
2. Kiser, J.D., & Paine, D.P., (2003). *Aerial photography and image interpretation*, New York: John Wiley & Sons.
3. Janssen, L. L., &Huurneman, G. (2000). *Principles of remote sensing*: ITC, International Institute for Aerospace Survey and Earth Sciences.

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GEOG – 7119	Principles of Remote Sensing	3(3-0)

Course Brief:

It describes about knowledge of Remote Sensing (RS) and its practical implementation. To produce students, that has applicable knowledge about basic tools of GIS. The course aims to equip students with an understanding of GIS, evolution and applications of spatial data through Geo-spatial technologies. Remote sensing is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance from the targeted area. Special cameras collect remotely sensed images of the Earth, which help researchers "sense" things about the Earth.

Course Learning Objectives:

This study introduces knowledge of recording earth's surface features from space-borne platforms and different ways in which images can be analyzed. It will enable students to develop an understanding of common remote sensing products such as, earth resources satellite images, aerial photographs etc to develop a comprehension regarding ground-truthing aided by GPS.

Contents

1. Concepts and Foundations
2. Characteristics of Remote Sensing Systems
3. Ground Data Collection
4. Multispectral, Thermal and Hyper-spectral Scanning
5. Satellite Systems
6. Digital Image Processing
7. Application of Remote Sensing
8. Land Cover Mapping
9. Land use change monitoring
10. Urban expansion Mapping
11. Environmental Monitoring
12. Cadastral Mapping

Recommended Texts

1. Lilles T. M. & Kiefer, R. W. (2004).*Remote sensing and image interpretation.* New York: John Wiley & Sons.
2. Campbell, J. B. &Wynne, R. H. (2011).*Introduction to remote sensing.* New York: Guilford Press.

Suggested Readings

1. Lo, C. P. (2000). *Applied remote sensing.* Essex: Longman.
2. ITC (2004). *Principles of remote sensing.* ITC Educational Textbook Series. Enschede, The Netherlands.
3. Muralikrishna, I. V. (1992). *Remote sensing applications and geographic information systems.* New Delhi: McGraw Hill.

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GEOG - 7120	Agricultural Geography	3(3-0)

Course Brief:

Agricultural geography is a sub-discipline of human geography concerned with the spatial relationships found between agriculture and humans. Agricultural Geography provides the basic information of various types of the agriculture on the earth surface viz., Subsistence, commercial, horticulture, specialized etc. Agricultural Geography as a sub-discipline of human and economic geography. The geography of human activities is called as 'economic geography' which examines the primary, secondary, tertiary and quaternary activities of man. Man in his primeval stage was a hunter and gather and during the Neolithic period he learned the art of cultivation of crops.

Course Learning Objectives:

Agriculture had been the dominant economic activity in the past and it is still the mainstay of over two-third of the world population. The study of agricultural geography is thus of great social relevance among all the branches of human geography

Course Learning Objectives:

Agriculture had been the dominant economic activity in the past and it is still the mainstay of over two-third of the world population. The study of agricultural geography is thus of great social relevance among all the branches of human geography

Course Contents:

1. Introduction to agricultural geography:
2. Nature and scope
3. The origins and development of agriculture
4. Theoretical aspects of geographical location relevant to agriculture
5. Introduction; approaches to the study of agriculture in geography
6. Approaches: commodity, regional, deterministic, systematic
7. factors influencing agricultural patterns:
8. Physical factors: the terrain, climate, soil, water resources
9. Socio-economic factors: technological, population, cultural, infrastructure
10. Land, labour and capital
11. Government and regional policies, models in agricultural geography:
12. The nature and need of models
13. Classification of models
14. Models of agricultural activity, agricultural regions: concepts and techniques:
15. Concept and methodology
16. Techniques: normative, empirical, single element, statistical
17. Methods of agricultural regionalization
18. Data classification and distribution

Recommended Texts:

1. Newbury, P. A. R. (1999). *Agricultural geography*. London: Longman.
2. Shukla, L. (2011). *Readings in agricultural geography*. Jaipur: Scientific Publisher.

Suggested Readings:

1. Laingen, C. & L. Butler, H. (2013). *Agricultural geography*. Oxford Bibliographies. Oxford: Oxford University Press. DOI 10.1093/OBO/9780199874002-006
2. Bowler, I. R. (2002) *The industrialization of Agriculture*. Oxford: Oxford University Press.
3. Singh, J. &Dhillon, S. S. (2000). *Agricultural geography*. New Delhi: McGraw-Hill.

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