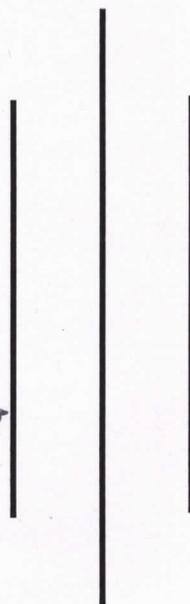


Tribhuvan University
Faculty of Humanities and Social Sciences



Curriculum for Four Years Bachelor Level
in
Geography



Geography Subject Committee

2019

Contents

	Page
Geog 410: Geography (Elective)	1
Geog 421: Physical Geography	4
Geog 422: Regional Geography of Nepal	7
Geog 423: Human Geography	10
Geog 424: Geography Practical	14
Geog 425: Geographic Information System (GIS) and Remote Sensing (RS)	17
Geog 426: Geographic Thought and Natural Resource Management	21
Geog 427: Research Methodology and Quantitative Techniques	26



[Handwritten signature]

[Handwritten signature]



Geog 410: Geography (Elective)

Full marks: 100

Lecture hours: 150

Internal evaluation:30%

Year-end exam: 70%

Objective of the Course:

The objective of this course is to familiarize the students with the basics of geography. After completing the course, the students will be able to understand the broader scope of the discipline and the importance of geographic knowledge to deal with the everyday uses of human-environmental system and interactions. Furthermore, the students will also be able to analyze acquired knowledge from geographic lens and apply the results to address specific problems whether geographic or non-geographic but are important for human community to adjust or negotiate with broader natural and socio-political system.

Course contents

	Teaching Hours
Unit 1 Nature of geography	10
1.1 Definition, scope and branches of geography	
1.2 Fundamental concepts in geography: Latitude, longitude, time zone, rotation, revolution, distance, location, area, interdependence and uniqueness of place	
1.3 Geography as an integrated discipline, and as a spatial science	
Unit 2 Earth system dynamics	25
2.1 Origin and interior structure of the earth	
2.2 Origin of the continents and oceans (Plate tectonics theory)	
2.3 Major landforms : 1 st order, 2 nd order and 3 rd order	
2.4 Geomorphic processes and landforms	
2.5 The works of rivers and glaciers: Process and topography	
Unit 3 The atmosphere as our existence	20
3.1.1 Extent and composition of the atmosphere	
3.1.2 Atmospheric temperatures: Distributions and inversion of temperature	
3.1.3 Moisture in the atmosphere: Humidity and condensations	
3.1.4 Atmospheric pressure and wind system with special focus to Monsoons	
3.1.5 Climatic classifications, climate change and human as an actor	



Handwritten signature and date '2017'.



Central Department of Geography
Kirtipur

Unit 4 Human nature interaction

25

- 4.1 Evolution of human and the races
- 4.2 Human nature relationship: Environmental determinism, possibilism, neo-determinism and human-environmental system
- 4.3 Rural and urban settlements: Concept, types and classification
- 4.4 Population: Change and distribution
- 4.5 Agriculture and industries as major human activities

Unit 5 Nepal: Geography and socio-economic and political dimensions

35

- 5.1 Location and geopolitical situation
- 5.2 Physiography and drainage system; climates and their changes
- 5.3 Natural resources: Soil and mineral, forest, water, biodiversity resources
- 5.4 Population change, composition, distribution and migration
- 5.5 Economy: Agriculture, industry, trade and transportation
- 5.6 Tourism and heritage: Concept, problems and prospects
- 5.7 Development planning and administration: Characteristics of federal, provincial, local units
- 5.8 Disasters and Disaster Risk Management (DRM) in Nepal

Unit 6 Maps and map readings

20

- 6.1 Concept and types of maps (Topographic and thematic maps)
- 6.2 Map reading, interpretation and navigation on Web map
- 6.3 Elements of map, map projection and symbolization
- 6.4 Scale: Representative Fraction and graphical scale, large scale, medium scale and small scale maps
- 6.5 Remote Sensing and GIS: Concept, interpretation and application (Aerial photographs, Satellite Image, Unmanned Aerial Vehicle and GPS)

Unit 7 Field survey, report preparation and presentation

15

- 7.1 Selection of an issue and survey of an area
- 7.2 Data collection, analysis and report preparation
- 7.3 Presentation of the report

Or

Data analysis using basic concepts of geography

15

- 7.1 Analysis of existing data (location, distance and interaction)
- 7.2 Report preparation
- 7.3 Presentation of the report



Suggested Readings

- Bryant, Richard H. (1992). *Physical Geography*. India: Rupa & Company.
- CBS (2019). *Environment Statistics of Nepal*. Kathmandu: Central Bureau of Statistics.
- CBS (2019). *Report on the Nepal Labour Force Survey 2017/18*. Kathmandu: Central Bureau of Statistics
- Chritchfield, H. J. (1995). *General Climatology*. New Delhi: Prentice Hall.
- Husain, Majid (2004). *Human Geography*. New Delhi: Rawat Publication.
- Knowles, R and Wareing, J. (1992). *Economic and Social Geography*. India: Rupa & Company.
- Lal, D.S. (1998). *Climatology*. Allahabad: Chaitanya Publishing House.
- Lekhak, Hari Datta and Lekhak, Binod (2009). *Natural Resource Conservation and Sustainable Development in Nepal*. Kathmandu: Kshitiz Publication.
- Naya Va, J. L. (1975). Climates of Nepal. *The Himalayan Review*. Vol. VII. Kathmandu: Nepal Geographical Society, 14-20.
- Nepal, Pashupati (2068 BS). *Climatology* (in Nepali). Kathmandu: Pairavi Prakashan.
- Pandey, Gopi Krishna (2074 BS). *Fundamentals of Geomorphology*. Kathmandu: Bhudipuram Prakashan.
- Shrestha, Sharan Hari (2004). *Economic Geography of Nepal*. Kathmandu: Educational Publishing House.
- Singh, R. L. (1999). *Elements of Practical Geography*. New Delhi: Kalyani Publishers.
- Singh, S. (1991). *Physical Geography*. Allahabad: Prayag Pustak Bhawan.
- UNFCCC (2007). *Climate Change: Impacts Vulnerabilities and Adaptation in Developing Countries*. Germany: United Nations Framework Convention on Climate Change.



2017



Geog 421: Physical Geography

Full marks: 100

Internal evaluation: 30%

Lecture hours: 150

Year-end exam: 70%

Objective of the Course

The objective of this course is to familiarize the students with physical geography at Bachelor's level with focus to geomorphology and climatology. It aims to deliver the knowledge and skills about landform, geomorphic process and climate to the students. At the end of the course, the students will be able to describe and explain essential elements of the physical geography.

Course contents

Teaching Hours

Geomorphology

Unit 1: Geomorphology and its place in geography 5

- 1.1. Definition, scope and place in geography and allied sciences
- 1.2. Geomorphological concepts and approaches

Unit 2: Earth structure and landform 5

- 2.1 Structure of the earth
- 2.2 Landforms, orders and types

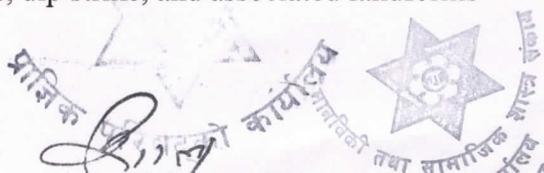
Unit 3: Crustal movement theories and diastrophism 20

- 3.1 Continental drift theory
- 3.2 Convectional current theory
- 3.3 Plate tectonics
- 3.4 Diastrophism: Epeirogenic and orogenic movement
- 3.5 Earthquake and volcanoes

Unit 4: Rocks, structure and landform

- 4.1 Rock types, composition, and formation and features
- 4.2 Major minerals found in rocks
- 4.3 Landforms associated with rock types
- 4.4 Fold, faults, joints, dip strike, and associated landforms

15



Unit 5: Weathering and mass movement: Type and landforms	5
5.1 Weathering	
5.2 Mass movement	
Unit 6: Earth surface process and landform	20
6.1 Fluvial system and drainage pattern	
6.2 Fluvial process and landform	
6.2 Snow and glaciers	
6.3 Aeolian and Karst environment	
Unit 7: Applied geomorphology with reference to Nepal	5
7.1 Development infrastructure	
7.2 Hazard assessment and adaptation	
7.3 Land use and settlement planning	
 Climatology	
Unit 8: Introduction	10
8.1 Nature and scope of climatology	
8.2 Weather and climate	
8.3 Origin, composition, and extent of the atmosphere	
Unit 9: Solar energy of the atmosphere	8
9.1 Solar radiation and insolation	
9.2 Determinants of solar radiation (Planet and Atmospheric)	
9.3 Distribution of solar energy	
Unit 10: Atmospheric temperature	10
10.1 Air temperature and its measurement	
10.2 Heating and cooling process	
10.3 Global heat budget	
10.4 Factors and distribution of temperature	
Unit 11: Atmospheric moisture and precipitation	15
11.1 The hydrological cycle	
11.2 Humidity: Concept, types, distribution and measurement	
11.3 Condensation: Processes and forms of condensation	
11.4 Clouds: Classification and distribution	
11.5 Precipitation: Types and distribution of precipitation	

परिचालको कार्यालय
कोटिपुर

Central Department of Geography
Kirtipur

सिद्धि

सामाजिक शास्त्र विभाग
दिवस

Unit 12: Pressure systems and winds	10
12.1 Concept of air pressure and winds	
12.2 Types, measurement and distribution	
12.3 Classification of winds: Planetary, seasonal, local and variable winds	
Unit 13: Classification of climates of the world: Koeppen and Thornthwaite	5
Unit 14: Air masses and fronts	7
14.1 Sources, characteristics and classification of air masses	
14.2 Characteristics, classification and world pattern of fronts	
Unit 15: Climate change: Concept, trend, impact and adaptation	5
Unit 16: Applied climatology: Climate and soil, Climate and vegetation,	5
Climate and water resources, and Climate and agriculture	

Required readings

- Chritchfield, H. J. (1995). *General Climatology*, New Delhi: Prentice Hall.
- Dayal, P. (1994). *A Text Book of Geomorphology*. Patna: Shukla Book Depot
- Huggett, R. J. (2017). *Fundamentals of Geomorphology*. Routedledge. (Available in online)
- Joseph A. Mason (2015). *Physical Geography: The Global Environment*. Oxford University Press
- Lal, D. S. (1998). *Climatology*. Allahabad: Chaitanya Publishing House.
- Naya Va, J. L. (1975). Climates of Nepal. *The Himalayan Review*. Vol. VII. Kathmandu: Nepal Geographical Society, 14-20.
- Nepal, Pashupati (2068 BS). *Climatology* (in Nepali). Kathmandu: Pairavi Prakashan.
- Pandey, Gopi Krishna (2074 BS). *Fundamentals of Geomorphology*. Kathmandu: Bhudipuram Prakashan.
- Rajbanshi, A. (2057 BS). *Climatology*, (In Nepali), Kathmandu: Nima Pustak Prakashan.
- Robert E. Gabler, James F. Petersen, L. Michael Trapasso, Dorothy Sack (2009). *Physical Geography (Ninth Edition)*. Cengage Learning
- Singh, S. (1991). *Physical Geography*. Allahabad: Prayag Pustak Bhawan.
- Singh, S. (2004). *Geomorphology*. Allahabad: Prayag Pustak Bhawan.
- UNFCCC (2007). *Climate Change: Impacts Vulnerabilities and Adaptation in Developing Countries*, Germany: United Nations Framework Convention on Climate Change (UNFCCC).



Geog 422: Regional Geography of Nepal

Full marks: 100

Lecture hours: 150

Internal evaluation: 30%

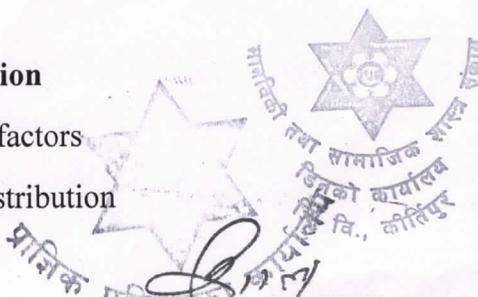
Year-end exam: 70%

Objective of the Course:

The objective of this course is to familiarize the students with the knowledge of Nepal under regional, physical, social and economic domain. After completion of the course, the students will be able to apply the geographical perspective and skills in order to critically examine the regional/federal development in Nepal. It will also enable the students to understand prospects and problems of the country in the context of balance development.

Course contents

	Teaching Hours
Unit 1: Region and regionalization in Nepal	15
1.1 Concept and types of regions	
1.2 Regions of Nepal (Ecological and Politico-administrative)	
1.3 Problems of regionalization	
Unit 2: Physiography	10
2.1 Origin of the Nepal Himalayas	
2.2 Physiographic division (High Himalaya, High Mountain, Middle Mountain, Siwaliks/Chure and Tarai)	
Unit 3: Climate	5
3.1 Influencing factors of climate	
3.2 Climatic condition	
3.3 Climatic regions	
3.4 Effects of monsoon on Nepalese life and economy	
Unit 4: River, lakes and glaciers	15
4.1 River system	
4.2 Lakes and ponds	
4.3 Glaciers	
Unit 5: Natural vegetation	
5.1 Controlling factors	
5.2 Type and distribution	



Unit 6: Natural resources: Status, prospects and problems	25
6.1 Water resources	
6.2 Mineral resources	
6.3 Land/soil resources	
6.4 Forest resources	
6.5 Solar and wind resources	
Unit 7: Biodiversity	5
7.1 Concept, importance and status of biodiversity	
7.2 Threats to biodiversity	
7.3 Biodiversity conservation (<i>In-Situ, Ex-Situ</i>)	
Unit 8: Agriculture: Nature and characteristics	20
8.1 Farming system and cropping pattern	
8.2 Major cereal crops: Production and distribution	
8.3 Major cash crops: Production and distribution	
8.4 Livestock and aquaculture farming	
Unit 9: Population	15
9.1 Population (size and composition, change, distribution and density)	
9.2 Internal and international migration (trend, causes and consequences)	
Unit 10: Settlement and urbanization	20
10.1 Rural: Concept and types	
10.2 Urban: Process, trend and pattern	
10.3 Rural urban linkage	
Unit 11: Industries	5
11.1 Small and cottage industries (status and importance)	
11.2 Manufacturing industries (growth, types and distribution)	
11.3 Special economic zone (SEZ)	
11.4 Problems and prospect	
Unit 12: Transportation and communication	
12.1 Role and modes	
12.2 Problems and prospect	

प्राज्ञिक परिषद्को कार्यालय
कीर्तिपुर

भारतको तथा सामाजिक शास्त्र पढाउने
दिनको कार्यालय
त्रि. वि., कीर्तिपुर

5
Central Department of Geography
Kirtipur

[Handwritten Signature]

- 13.1 Nature and types
- 13.2 Trend
- 13.3 Problems and prospects

Suggested Readings

- CBS (2014). *Population monograph of Nepal (Vol. I, II, III)*. Kathmandu: CBS
- CBS (2019). *Environment Statistics of Nepal*. Kathmandu: CBS.
- Chapagain, P. S. (2017). *Contemporary readings in geography of Nepal*. Kathmandu: Ekta Books Distributors Pvt. Ltd.
- Gurung, Harka (1989). *Dimensions of Development*. Kathmandu: Mrs. Saroj Gurung.
- Hagen, Tony (1961). *Nepal: The kingdom in the Himalayas*. New Delhi: Oxford.
- Lekhak, H. D. and Lekhak, B. (2003). *Natural resource conservation and sustainable development*. Kathmandu: Kshitiz Publication.
- Pradhan, P. K. and Sigdel, T. S. (2064 BS). *Sahar-gaun sambandha ra gramini bikash* (in Nepali). Kirtipur: New Hira Books Enterprises.
- Rai, D. B. (2074 BS). *Nepalko bhautik tatha arthik bhoogol* (Physical and economic geography of Nepal). Kathmandu: Makalu Prakashan Griha.
- Rai, D. B. (2074 BS). *Nepalko samajik bhoogol* (Social geography of Nepal). Kathmandu: Makalu Prakashan Griha.
- Shrestha, C. B. and Rijal, S. P. ((2016). *Nepal: Cultural geography*. Lalitpur: Prakash Shrestha and Sunil Shrestha.
- Shrestha, C. B., Rijal, S. P. and Chidi C. L. (2018). *Settlement geography of Nepal*. Kathmandu: KEC Publications.
- Shrestha, Sharan Hari (2004). *Economic geography of Nepal*. Kathmandu: Educational Publishing House.
- Shrestha, Sharan Hari (2047). *Nepalko aarthik tatha manab bhoogol* (Economic and human geography of Nepal). Kathmandu: Educational Enterprises Pvt. Ltd.
- Shrestha, V. P. (2007). *A concise geography of Nepal*. Kathmandu: Mandala Publications.
- Upadhyaya, Bhagawati (1994). *Industrial geography of Nepal*. Kathmandu: Ratna Pustak Bhandar.



Geog 423: Human Geography

Full marks: 100

Lecture hours: 150

Internal evaluation: 30%

Year-end exam: 70%

Objective of the Course:

The objective of this course is to familiarize the students with the basic concepts and principles of human geography. It will enable the students to understand geography as a social science by emphasizing the relevance of geographic concepts to human problems. After completing the course, the students will be able to apply the specific knowledge and skills in their relevant context. The course will also enable the students to critically examine the human geography in the context of Nepal.

Course contents

	Teaching Hours
Unit1: Introduction	15
1.1 Definition, concepts and scope of human geography	
1.2 Development and recent trend in human geography	
1.3 Branches of human geography	
1.4 Approaches to human geography	
Unit 2: Human and environment	10
2.1 Natural and cultural environment	
2.2 Schools of human geography: Environmentalism, possibilism and neo-determinism	
2.7 Regional human geography: Human geography of mountains and plains	
Unit 3: World population	20
2.1 Population distribution and growth	
2.2 Determinants of distribution and growth	
2.3 Population density	
2.4 Population problems of developed and developing countries	



Unit 4: Migration

15

- 6.1 Concept and types
- 6.2 Causes and consequences of migration
- 6.3 Migration Theories: Ravenstein's Laws of migration, Zipf's Gravity Model, Everett Lee's theory of migration, Push-pull hypothesis, and Todaro's model of migration
- 6.4 International migration with reference to Nepal

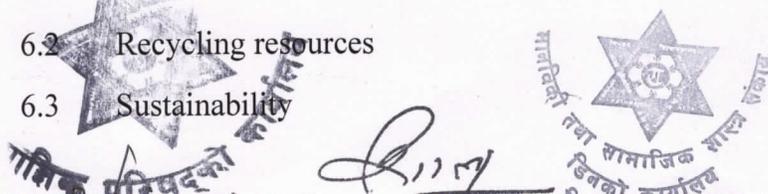
Unit 5: Economic activities in the world

40

- 6.4 Types of economic activities: Primary, secondary and tertiary
- 6.5 Food gathering and hunting
- 6.6 Agriculture
 - 6.6.1 Physical and socio-economic influence on agriculture
 - 6.6.2 Types of agriculture (Pastoral/nomadic herding, livestock ranching shifting cultivation, sedentary farming, intensive subsistence farming, commercial grain farming, commercial plantation)
 - 6.6.3 Agriculture land use theory of Von Thunen
- 6.7 Mineral Resources
 - 6.7.1 Geographical factors affecting mineral resources
 - 6.7.2 Types of mineral resources
 - 6.7.3 Production and distribution of iron ore and copper minerals
- 6.8 Manufacturing
 - 6.8.1 Factors affecting localization of industries
 - 6.8.2 Production and distribution of iron-steel and cotton textile industries
 - 6.8.3 Industrial location theory of Alfred Weber
- 6.9 Transportation
 - 6.9.1 Role of transportation
 - 6.9.2 Distribution of land, water and air transportation

Unit 6: Conserving and re-using resources

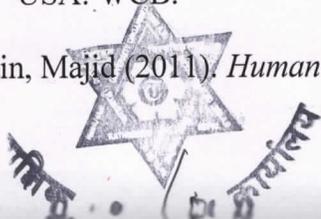
- 6.1 Renewable resources
- 6.2 Recycling resources
- 6.3 Sustainability



- 7.1 Concept: Geography and settlement
- 7.2 Functional classification of settlement
 - 7.2.1 Rural settlement
 - 7.2.1.1 Concept and classification
 - 7.2.1.2 Morphology and distribution pattern of rural settlement
 - 7.2.1.3 Locational factors of rural settlement
 - 7.2.1.4 Rural houses: Types and factors
 - 7.2.2 Urban settlement
 - 7.2.2.1 Concept and urban Hierarchy
 - 7.2.2.2 Causes of urbanization
 - 7.2.2.3 Functional classification
 - 7.2.2.4 Trend of urbanization
 - 7.2.2.5 Central place theory of Walter Christaller
 - 7.2.2.6 Urban environmental issues
 - 7.2.2.7 Theories on urban land use: The concentric zone model of E.W. Burgess, the wedge or sectoral model of Homer Hoyt and M.R. Davis and the multiple nuclei model of C.D. Harris and E.L. Ullman

Required Readings

- Alexander, J. W. (1963). *Economic Geography*. New Jersey: Prentice Hall.
- Brettell, J. and Hollifield, J. F. (2015). *Migration Theory: Talking Across Disciplines*. New York: Routledge.
- Brunn and Williams (1983). *Cities of the World: World Regional Urban Development*. New York: Harper & Row.
- D.C.Money (1978). *Introduction to Human Geography*. Great Britain: Red Wood Burn Ltd.
- Fellmann, Getis, & Getis (1990). *Human Geography: Landscape of Human Activities*. USA: WCB.
- Hussain, Majid (2011). *Human Geography*. Jaipur India: Rawat publications.



Jakle, Brunn and Roseman (1976). *Human Spatial Behavior: A Social Geography*. USA: Duxbury Press.

James M. Rubenstein (1992). *The Cultural Landscape: An Introduction to Human Geography*. New York: Macmillan Publishing Company.

John Lowe, Eldor Pederson (1987). *Human Geography: An Integrated Approach*. Canada: John Wiley & Sons, Inc, Canada.

Keith Chapman (1978). *People, Pattern and Process An Introduction to Human Geography*, New York: John Wiley & Sons.

Murray Austin, R. Honey and Thomas C. Eagle (1987). *Human Geography*. New York: West Publishing Company.

Robenstein, James M. (2012). *Contemporary human geography*. New Delhi: PHI Learning Private Limited.

Robert P. Larkin, Gary L. Peters and Christopher H. Exline (1981). *People, Environment, and place*. USA: A Bell & Howell company.

Roy, Prithwish (2007). *Economic geography: A study of resources*. Kolkata: New Central Book Agency (P) Ltd.

Shrestha, Chandra Bahadur (2040). *Manab Bhugol*. Bhaktapur: Pustak Sadan.



Li



Geog 424: Geography Practical

Full marks: 100

Lecture hours: 150

Internal evaluation: 30%

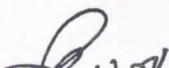
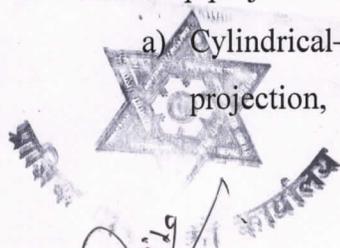
Year-end exam: 70%

Objective of the Course:

The objective of this course is to impart knowledge to the students about the principles and techniques of cartography, surveying, and field study techniques as well as to internalize basic map designing knowledge. At the end of the courses the students will be able to use various techniques of the preparation of maps with suitable mapping symbols for the representation of different types of statistical data. Similarly, they will also be able to collect data from the field and make field report independently.

Course contents

	Teaching Hours
Unit 1: Cartography	70
1.1 Cartography : Basic concepts, scope and trends	02
1.2 Maps and symbols: Meaning, importance and types of symbols (point, line and area; and geometrical, pictorial, letter and number), visual (graphic) variables.	03
1.3 Map design: Materials, map layout (map scale and its types), map elements (margins, legends, north line; grid and graticule)	02
1.4 Thematic mapping: Introduction, types, construction and interpretation of thematic maps (qualitative and quantitative), choropleth, isopleths, dot, and flow diagram	10
1.5 Area measurement: Square, dot and GIS methods	03
1.6 Cartographic representation of statistical data: Graphical representation (line and bar) and diagrammatic representation (block piling, proportional rings, and sphere, cartograms)	
1.7 Map projection: Introduction, properties, use, major types and methods	30
a) Cylindrical-type projections: i) Simple cylindrical or cylindrical equidistant projection, ii) cylindrical equal area projection iii) Mercator's projection	



Central Department of Geography
Kirtipur

(Cylindrical orthomorphic projection) or UTM (Universal Transverse Mercator's Projection)

b) Conical–type projections: i) Simple conic projections: one standard parallel

ii) Conical projection with two standard parallels

c) Zenithal–type projections: i) Zenithal equidistant projection and ii) Zenithal equal area projection

15

1.8 Interpretation of map: Topographic, cadastral, and weather maps

05

Unit 2: Visualization of images and maps

05

2.1 Remote sensing images: Introduction to aerial photography and satellite imageries

2.2 Google earth image: Reading & use

2.3 Web based maps: Sources and its use

2.4 GIS: Introduction and its use

Unit 3: Fundamentals of surveying

20

3.1 Introduction: Definition, classification, principles, methods

3.2 Map scale: Statement, Representative Fraction (R.F.), Graphical scale (linear)

3.3 Height and distance: Relations of angles and sides of a right angle triangle

3.4 Surveying and map preparation with the help of: i) Prismatic compass or plane table and ii) GPS or Abney level

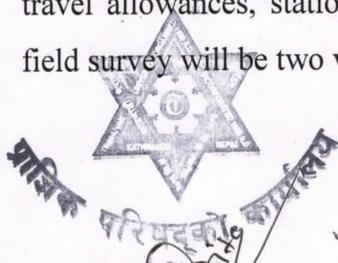
Unit 4: Field study

55

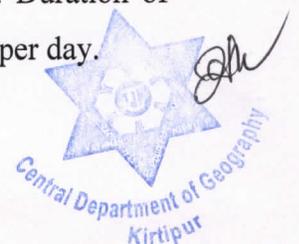
4.1 Orientation: Orientation is focused on introduction and importance of field survey in geography which includes the identification of the problem, research objectives, data processing and analysis of collected data during field survey and preparation of final report.

4.2 Field trip (Within the country)

Note: The field area shall be selected by the Department. The cost for students and concern faculties will be borne by Tribhuvan University. Expenses will include daily and travel allowances, stationary and first aid equipment including medicines. Duration of field survey will be two weeks. One practical class is equivalent to two hour per day.



Signature



Project Work/Practical Book: Candidates should fulfill following three requirements to appear in the final examination of practical geography.

1. Cartography: Preparation of line and graphs, two dimensional diagrams, square, ring, block piling, distribution/density maps, flow diagram, weather maps, topographical and cadastral maps.
2. Surveying: Plane table or prismatic compass, Abney or GPS
3. Field Report: Excursion report based on primary data collected from field trip

Suggested Readings

Dent, D; Torguson, J. and Holder, T W. (2008). *Cartography: Thematic Map Design*. Delhi, McGraw Hill

Edney, M. H. (2019). *Cartography: The Ideal and History*. Chicago: University of Chicago Press

Jankraak, M. and Ormeling, F. (2004). *Cartography: Visualization of Geospatial Data*. New Delhi: Pearson Education.

Keats, J. S. (1989). *Cartographic Design and Production*. London: Longman Group Ltd.

Misra, R. P and Ramesh, A. (1989). *Fundamentals of Cartography*. New Delhi: Concept Publishing.

Monkhouse, F. J. and Wilkinson, H.R. (1998). *Maps and Diagrams*. New Delhi: B. I. Publication

Parkes, G. (2017). *Cartography: An Introduction*. Trans Atlantic Publications Inc.

Raiz, Erwin (1989). *General Cartography*. New Delhi: McGraw Hill.

Singh, R. L. (2004). *Elements of Practical Geography*. New Delhi: Kalyani Publisher.



[Handwritten signature]



Geog 425: Geographic Information System (GIS) and Remote Sensing (RS)

Full marks: 100

Lecture hours: 150

Internal evaluation: 30%

Year-end exam: 70%

Objective of the Course:

The objective of this course is to familiarize students with the theoretical and practical knowledge and skill of GIS and RS tools and techniques. The course is designed to provide general and basic understanding of GIS and RS data, types, processing geographic data, analysis and remote sensing image interpretation. Teaching hours and mark is divided equally to GIS and Remote Sensing. Total teaching hours for theory and concept is 45 and teaching hours for practical should be counted double of theory classes hence, 30hrs is counted as $30*2=60$ hrs.

Course contents

Teaching Hours

Geographic Information System (GIS)

Unit 1: Introduction to GIS

5

- 1.1 Concept and definition of GIS
- 1.2 Development of GIS
- 1.3 Application of GIS: Physical/natural, socio-economic applications

Unit 2: Components of GIS

5

- 2.1 Physical components of GIS (Hardware, Software, Data, People, Network)
- 2.2 Functional components of GIS (Data Capture, Database Management, Analysis, & Output)

Unit 3: Data sources, input methods and data quality

10

- 3.1 Spatial and attribute data sources (Analog Map, Aerial Photo, Remote Sensing, GPS, Existing Digital Data, Socio-economic Data & others)
- 3.2. Input methods (Scanning, Digitizing, Extraction)
- 3.3 GIS data quality (Measurement, Representation, Projection and Scale)



[Handwritten signature]



Unit 4: GIS data structure and GIS database	10
4.1 Vector data structure and its advantages and disadvantages	
4.2 Raster data structure and its advantages and disadvantages	
4.3 GIS database and database management	
Unit 5: Global Positioning System (GPS)	5
5.1 Concept, principles and application of GPS	
5.2 Integration into GIS and RS	
Unit 6: Geo-processing and spatial analysis	10
6.1 Geo-Processing: (Boundary Operations)	
6.2 Spatial Analysis: (Proximity, Overlay: point, line and polygon)	
6.3 Output Preparation	

Unit 7: GIS practical **30 (Total count=30*2)**

Hands-on Exercise on:

- 7.1 Geo-referencing (Practical for Unit: 3)
- 7.2 Spatial transformation: Coordinate system and map projection (Practical for Unit: 3)
- 7.3 Spatial data input and editing (Practical for Unit 3: Point, Line, Polygon)
- 7.4 Attribute data management and integration (Practical for Unit 4)
- 7.5 Geo-processing (Clip, Dissolve, Merge, Buffer, Union, Intersection) (Practical for Unit 6)
- 7.6 Map design/layout (Practical for Unit 2 & 6)

Remote Sensing (RS)

Unit 8: Fundamentals of RS

- 8.1 Concept, scope and history of remote sensing
- 8.2 Electromagnetic radiation and its characteristics
- 8.3 Sources of energy, energy interaction with atmosphere and earth surface features
- 8.4 Application areas of remote sensing

Unit 9: Satellites, sensors and their characteristics

- 9.1 Types of remote sensing
- 9.2 Sensor types, characteristics and platforms (Types and Orbital Characteristics)
- 9.3 Resolution (Spectral, Radiometric, Spatial, and Temporal)



[Handwritten signature]

Unit10: Aerial photographic systems

5

- 10.1 Aerial camera, filter
- 10.2 Types of aerial photographs
- 10.3 Geometric properties and elements of aerial photo interpretation

Unit11: Digital image processing and satellite image interpretation

15

- 11.1 Digital image processing (Contrast enhancement and Filtering)
- 11.2 Elements of visual image interpretation
- 11.3 Image classification

Unit 12: Remote sensing practical

Hands-on Exercise on: (Unit-wise)

30 (Total count is 30*2)

- 12.1 Overview of image processing software (e.g. ERDAS Imagine)
- 12.2 Image geo-referencing (Practical for Unit 9)
- 12.3 Layer stacking (Practical for Unit 11)
- 12.4 Image mosaicing (Practical for Unit 11)
- 12.5 Extraction of AOI (Sub-setting) (Practical for Unit 11)
- 12.6 Color composites (Practical for Unit 11)
- 12.7 Image classification (Unsupervised and Supervised) (Practical for Unit 11)
- 12.8 Application of Google Earth image (Land use/land cover) (Practical for Unit 11)

Project Work:

Student should submit assigned project work based on practical exercises as a compiled GIS and RS project report

Teaching Materials:

1. Maps and Satellite images: Topographic, thematic, air photo and satellite image hard-copy and digital
2. Hardware: GPS, Desktop Computer, Printer, Computer Laboratory
3. Software: GIS software and Remote Sensing Software



[Handwritten signature]

Required Readings for GIS:

- Aronoff, S. (1989). *Geographic information systems: A management perspective*. Ottawa: WDL Publications.
- Chang, K. T. (2010). *Introduction to geographical information systems*. McGraw-Hill
- Deby, R.A. (ed.) (2000). *Principles of geographic information systems*. Enschede: International Institute of Aerospace Survey and Earth Sciences (ITC).
- Heywood, I., Cornelius, S. and Carver, S. (2006). *An introduction to geographic information system*. Prentice Hall.
- Robinson, A. H. (ed.) (1995). *Elements of cartography*. New York: John Willey & sons.
- Van Sickle, J. (2008). *GPS for land surveyors*. CRC Press.

Required Readings for RS

- Campbell, J. B. (2011). *Introduction to remote sensing*. The Guilford Press.
- David, P. P., & James D. K. (2012). *Aerial photography and image interpretation*. John Wiley & Sons.
- Lillesand, T. M. & Kiefer, R. W. (2010). *Remote sensing and image interpretation*. John Wiley and Sons.
- Sabins, F.F. (1986). *Remote sensing: Principles and interpretation*. New York: W.H. Freeman.



Handwritten signature in black ink.

Geog 426: Geographic Thought and Natural Resource Management

Full marks: 100

Internal evaluation: 30%

Lecture hours: 150

Year-end exam: 70%

Objective of the Course:

The objective of Geographic Thought course is to familiarize students with the evolution of geographical knowledge and its contributors. At the end of the course the student will be able to understand the development of geographic knowledge, ideas, concepts and methodologies as well as assess the contributions of the notable geographers. Similarly, the objective of Resource Management course is to provide an overview of concepts and practices of natural resources management and planning. The course focuses on the concepts dealing with natural (e.g. ecology) and social (e.g. planning) processes. By the end of the course students will be able to understand and explain the meaning, approaches and management as well as various concepts, theories and techniques related to natural resources management practices in Nepal.

Course contents

Geographic Thought

Teaching Hours

Unit 1 Nature of geography

5

- 1.1 Meaning and scope of geography
- 1.2 Approaches to the study of geography
- 1.3 Branches of geography
- 1.4 Recent trends in geography
- 1.5 Relations with other sciences

Unit 2 Classical geography

- 2.1 Contribution of Greek geographers
- 2.2 Contribution of Roman geographers
- 2.3 Contribution of Muslim, Indian and Chinese geographers
- 2.4 The age of exploration and impact of discoveries



Unit 3 Modern geography

30

- 3.1 Period of Alexander von Humboldt and Carl Ritter
- 3.2 Contribution of German geographers
- 3.3 Contribution of French geographers
- 3.4 Contribution of Russian geographers
- 3.5 Contribution of British geographers
- 3.6 Contribution of American geographers

Unit 4 Dualism and dichotomies in geography

15

- 4.1 General geography versus Regional geography
- 4.2 Physical geography versus Human geography
- 4.3 Historical geography versus Contemporary geography
- 4.4 Functional region versus Formal region
- 4.5 Qualitative versus Quantitative geography

Unit 5 Development of geography in Nepal

10

- 5.1 Institutional and curriculum development
- 5.2 Geographical researches in Nepal

Natural Resource Management

Unit 6 Natural resource management

15

- 6.1 Concept and scope of natural resource management
- 6.2 Approaches of natural resource management
 - 6.2.1 Integrated approach
 - 6.2.2 Adaptive management approach
 - 6.2.3 Community based approach
 - 6.2.4 Conservation approach
- 6.3 Ownership regimes of natural resource management
 - 6.3.1 State-property regime
 - 6.3.2 Private property regime
 - 6.3.3 Common property regime
 - 6.3.4 Non-property (open access) regime



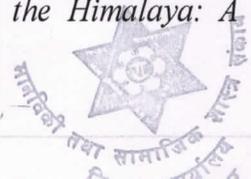
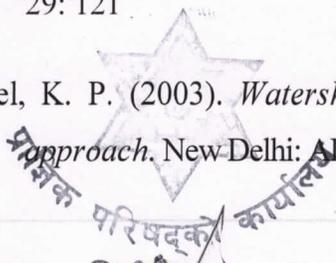
Unit 7 Classification of natural resources	5
7.1 Renewal resources	
7.2 Non-renewal resources	
Unit 8 Natural resource analysis tools and techniques	20
8.1 Identification of key environmental resource issues	
8.2 Identification of priority area	
8.3 Geographical Information System (GIS)	
8.4 Global Positioning System (GPS)	
8.5 Remote sensing and image interpretation	
8.6 Environmental Assessment (EA)	
8.7 Driving Forces-Pressure-State-Impact-Response (PSIR) Framework	
8.8 Community consultation and participatory planning	
8.9 SWOT analysis	
8.10 Human carrying capacity	
8.11 Decision making process for natural resource planning	
Unit 9 Resource mapping	15
9.1 Land use and land cover change	
9.2 Agriculture land suitability	
9.3 Land carrying capacity	
9.4 Ecological footprint	
9.5 Human population pressure on natural resource management	
Unit 10 Practices of natural resource management in Nepal	20
10.1 Community-based resource management	
10.2 Wet land Management	
10.3 Conservation practices	
10.4 Traditional/indigenous practices of resource management	
10.5 Case Studies:	
10.5.1 Chure conservation	
10.5.2 Extraction of river-bed deposits (Stone, gravel and sand)	
10.5.3 Annapurna conservation area	
10.5.4 Community forest	
10.5.5 Grazing system and livestock farming in hill and mountain area	

Required Readings for Geographic Thought:

- Adhikari, Sudeepta (1999). *Fundamentals of geographic thought*. Allahabad: Chaitanya Publishing House.
- Dikshit, R. K. (1998). *Geographic thought*. New Delhi: Prentice Hall of India.
- Husain, Majid (1993). *Evolution of geographical thought*. New Delhi: Rawat Publication.
- James Preston E. and Martin, Geoffrey J. (1981) *All possible worlds: A history of geographical ideas*. John Wiley and Sons
- Pande, Gopi Krishna (2060 BS). *Bhougolik bichardhara ko utpati ra bikas*. Kathmandu: Vidhyarthi Pustak Bhandar.
- Subedi, Bhim P and Poudel, Padma C (editors). *Geography and geographers' work in Nepal: Reflections on mountain environment and human activities*. Kathmandu: Central Department of Geography, Nepal Geographical Society and NCCR North-South.
- Subedi, Bhim Prasad (2014). *The state of geography teaching and research in Nepal*. Kathmandu: Martin Chautari.

Required Readings for Natural Resource Management:

- पोखेल, कविप्रसाद. (२०६८). प्राकृतिक स्रोत व्यवस्थापन, कीर्तिपुर: क्षितिज प्रकाशन ।
- Bhattarai, B.P. and Adhikari, J. (2015). *Natural resource management (Status, Threats and Conservation)*. Kathmandu: Highland Publication Pvt. Ltd.
- CBS (2019). *Environment Statistics of Nepal*. Kathmandu: Central Bureau of Statistics.
- Malla, U.M. (1998). Geography and resource conservation. 'Presidential Address' delivered on July 24, 1998, Nepal Geographical Society, *The Himalayan Review*. 29: 121
- Poudel, K. P. (2003). *Watershed management in the Himalaya: A resource analysis approach*. New Delhi: ADROIT Publishers.



Poudel, K. P. (2012). Resource management: A geographical perspectives. *The Third Pole*, 11-12, 21-28. Kirtipur: Department of Geography Education.

Pradhan, P. K. and Pradhan, B. (2006). *Environment and natural resource: Concepts, methods, planning and management*. Kathmandu: Quest Publication.

President Chure Tarai Madhesh Conservation Development Board. (2074). *President Chure-Tarai Madhesh Conservation and Management Master Plan*. Kathmandu: President Chure-Tarai Madhesh Conservation Development Board, Government of Nepal.

Singh, S. (1999). *Environmental Geography*. Allahabad: Prayag Pustak Bhandar.

Signature



Signature



Geog 427: Research Methodology and Quantitative Techniques

Full marks: 100

Lecture hours: 150

Internal evaluation: 30%

Year-end exam: 70%

Objective of the Course:

The objective of this course is to familiarize the students about basic research concepts of both qualitative and quantitative techniques and their application in geographical research. The students will also be familiar to elements of research proposal, data collection tools and techniques on geographical issues. At the end of the course, the students will be able to prepare a simple research report based on the knowledge and skills acquired in the course.

Course contents

Teaching Hours

Research Methodology

Unit 1: Introduction to research

5

- 1.1 Definition of research
- 1.2 Importance of research
- 1.3 The nature of geographical research

Unit 2: Introduction to the major elements of a research proposal

20

- 2.1 Selection of research topic
- 2.2 Elements of a research proposal (Introduction, statement of problems, objectives, importance of study, literature review, methods of data collection and analysis, reference).

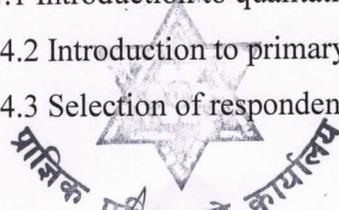
Unit 3: Literature review

5

- 3.1 Importance of literature review
- 3.2 Sources of literature (libraries, books, journals, thesis and dissertations, websites, etc).
- 3.3 Review of literature (issues, methods, and findings).

Unit 4: Method and tools of data collection

- 4.1 Introduction to qualitative and quantitative data
- 4.2 Introduction to primary and secondary data
- 4.3 Selection of respondents and familiarity with them



4.4 Introduction to methods of data collection (Survey, Interview, Focus group discussion, Key informant interview, Observation)

4.5 Tools of data collection (Questionnaires, interview guideline, inventory sheet, FGD guideline)

Unit 5: Method of data analysis and report writing

15

5.1 Data editing and error checking,

5.2 Data entry

5.3 Preparation of data tables and charts

5.4 Describing the findings

5.6 Citation and referencing

5.5 Preparations of the outline of report

Quantitative Techniques

Unit 6: Introduction, measurement scale and nature of geographical data

5

6.1 Primary and secondary data

6.2 Measurement scale (nominal, ordinal, interval and ratio)

6.3 Nature of geographical data

6.4 Parametric and non-parametric

6.5 Probability and significance

Unit 7: Measures of central tendency and dispersion

15

7.1 Measure of central tendency for linear data (Arithmetic mean, median and mode)

7.2 Measures of dispersion (range, quartile deviation, mean deviation and standard deviation and coefficient of variation)

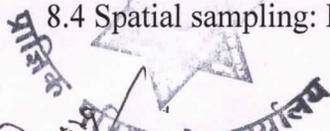
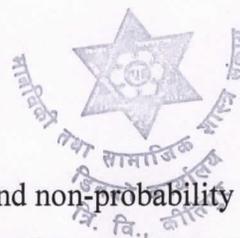
Unit 8: Sampling

8.1 Principles of sampling

8.2 Sampling design/methods: probability and non-probability

8.3 Sample size determination and estimation from samples

8.4 Spatial sampling: Line, Point & Polygon



[Handwritten signature]

Unit 9: Correlation and regression

10

- 9.1 Scatter diagram
- 9.2 Simple correlation (Karl Pearson product moment) and rank correlation (Spearman)
- 9.3 Simple linear regression

Unit 10: Spatial analysis

15

- 10.1 Centographic measures: Central location (Mean center, median center, harmonic mean center)
- 10.2 Point pattern analysis (Nearest neighbor and Quadratic measures)
- 10.3 Coefficient of Dispersion (Index of dispersion and comparison of frequency distribution)
- 10.4 Network analysis (Nodality, Accessibility/connectivity indices)
- 10.5 Spatial relationship/map comparison (Coefficient of Localization, Index of concentration, Lorenz curve, and Gini-coefficient)
- 10.6 Contiguity measurement

Unit 11: Analysis of time series

5

- 11.1 Components and utility
- 11.2 Methods of least square

Unit 12: Matrix algebra and calculus

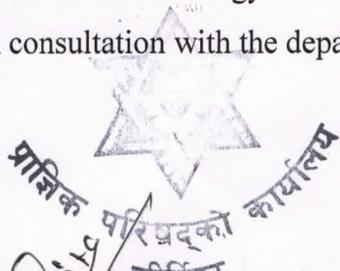
5

- 12.1 Matrix operation (Addition, subtraction, multiplication, inverse & determinants)
- 12.2 Calculus (Functions, limit, derivatives, and integration)

Unit 13: Preparation of research report

20

Students will prepare a research report based on the knowledge and skills acquired in the course Research Methodology and Quantitative Techniques. The research topic will be selected in consultation with the department.



[Handwritten signature]

Suggested Readings for Research Methodology

- Clifford, Nicholas J. and Valentine, Gill (eds) (2003). *Key methods in geography*. New Delhi: Sage Publications.
- Faculty of Humanities and Social Science (2014). A manual on formatting and organizing dissertations. Kathmandu: T.U. Dean's Office.
- Hay, Iain (ed.) (2000). *Qualitative research methods in human geography*. Melbourne: Oxford University Press.
- Kothari, C. R. (1990). *Research methodology*. India: Vishwa Prakashan.
- Pradhan, Pushkar K. (ed.), (2009). *Geographic research methods handbook*. CDG, T.U. and Swiss NCCR-North south.

Suggested Readings for Quantitative Techniques

- Ebdon, David (1985). *Statistics in Geography*. Oxford: Basil Blackwell Ltd.
- Gupta, S. P. (2017). *Fundamentals of Statistics*. Delhi: S Chand & Co.
- Hammond, H. and Mc Cullagh, P. S. (1974). *Quantitative Techniques in Geography: An Introduction*. Oxford: Clarandon Press.
- Louis J Deluca and James T Sedlock, *Calculus*. New Jersey: Prentice, Hall Inc.
- Taylor, P. J. (1972). *Quantitative methods in geography: An introduction to spatial analysis*. Atlanta: Houghton Muffin Company.
- Theakstene, W. H. and C. Harrison (1974). *The analysis of geographic data*. London: Heinemann Educational Books.
- Unwin, D. (1981). *Introductory spatial analysis*. London: Methuen.



Signature