

Syllabus  
Department of Geography and Environment

UNIVERSITY OF DHAKA



B.S (Honours) Sessions : 2018-2019 and 2019-2020

1 <sup>st</sup> year = Total Credit (Theory 12 +Lab 9 + Viva 1 + Minor 8)	= 30
2 <sup>nd</sup> year = Total Credit (Theory 16 +Lab 8 + Viva 2 + Minor 12)	= 38
3 <sup>rd</sup> year = Total Credit (Theory 26+Lab 9+ Viva 2)	= 37
4 <sup>th</sup> year = Total Credit (Theory 27+Lab 11+ Viva 2 )	= 40
Total	<hr/> 145

## First Year B.S (Honours) Course (Session : 2018-2019 and 2019-2020)

Course code	Course title	Credit hour
GETh 101	Introduction to Geography and Environment	2
GETh 102	Region and World Regional Pattern	2
GETh 103	Introduction to Physical Geography and Environment	2
GETh 104	Introduction to Human Geography and Environment	2
GETh 105	Fundamentals of Chemistry in Geography and Environment	2
GETh 106	Fundamentals of English Language	2
GELb 107	Fundamentals of Cartography and Map Projection	3
GELb 108	Introduction to Computer in Geography and Environment	2
GELb 109	Topographic Surveying-I	2
GELb 110	Introduction to Research and Field Studies	2
GEV 111	Viva	1
Total credit hours for major courses		22

<b>Minor Course (For Science Stream)</b>		
GLT 101: Geology-I		2
GLP 102: Petrology and Mineralogy Lab		2
SWE 101 : Introductory Soil-I		2
SWE 102: Introductory Soil-II		2
Total		8
<b>Minor Course (For other Streams)</b>		
Sociology Part-I		4
Introduction to Psychology		4
Total credit hours for minor courses		8
Grand Total credit hours (Major + Minor )		30

### **GETh 101 : Introduction to Geography and Environment**

**2 Credit Hour**

- 1.0 Geography and Environment: Methods, Scope and Purpose
  - 1.1 Geography as a discipline; Geography as a science; and Geography as a social science
  - 1.4 The context of Environment in Geography
  - 1.5 Scope of Geography and Environmental Studies
  - 1.6 Subject matter and branches of Geography
  - 1.7 Fundamental Concepts in Geography: Location, Distribution, Agglomeration; Process and Pattern, Interaction; Place, Space and Time; Shapes, Size, Distance; Thesis, Anti-thesis, Synthesis; and Region and Regionalization
  
- 2.0 Development of Gographical Ideas and Concepts  
(Brief history of the development of Geographical Knowledge and Concept)
  - 2.1. Ancient Period
  - 2.2 Greek and Roman Classical Period
  - 2.3. Middle Ages and Renaissance
  - 2.4. Muslim Periods
  - 2.5. Chinese and Indian Geography in the ancient and Middle ages
  
- 3.0 Major Views and Themes in Geography:
  - 3.1 Earth-Science View
  - 3.2 Man Environment View
  - 3.3 Regional View
  - 3.4 Spatial Organization View
  - 3.5 Behavioural View

### **Selected Readings**

- Chorley, R. and Peter Haggett (ed.) : *Models in Geography*  
Chorley, R.L. and Haggett, Peter *Frontiers in Geographical Teaching*.  
Diskinson, Robert E. *The Makers of Modern Geography*  
Dohrs, Fred F. and Sommers, L.M. *Introduction to Geography*  
Harvey, David : *Explanation in Geography*  
Huggett, P. : *Locational Analysis in Human Geography*  
James, Preston E.: *All Possible Words: History of Geographical Ideas*  
Johnston, R.J. *Geography and Geographers*  
Merrill, R *The Spatial Organization of Society*  
Minshull, Roger M.: *The Changing Nature of Geography*  
Murphy, Rhoads *An Introduction to Geography*.  
Murphy, Rhoads *The Scope of Geography*.  
Taaffe, Edward Ed. : *Geography*  
Taylor, Griffith *Geography in the Twentieth Century*  
ইসলাম, এম. আমিনুল, ভূগোল, দৃষ্টিভঙ্গি ও দর্শন, ভূগোল বিভাগ, ঢাকা বিশ্ববিদ্যালয়  
আহমাদ, নাফিস (অনুবাদ নজরুল ইসলাম ও জামাল খান), ভূগোল বিজ্ঞানে মুসলমানদের অবদান, ঢাকা : বাংলা একাডেমী  
দত্ত, কুম্ভলা লাহাড়ী, ভূগোল চিন্তার বিকাশ, কলিকাতা : ওয়ার্ল্ড প্রেস

### **GETh 102 : Region and World Regional Pattern**

**2 Credit Hour**

- 1. Region:** Definitions, Types, Characteristics, World Regionalization, Dynamic concepts
- 2. Regional Geography Basics:** Issues of people and land, Political Freedom, Economic Inequality, Global Economy, Natural Environment, Human Development and Human Rights
- 3. Globalization and World Regions:** Concepts and Facets of Globalization and Localization, Major World Regions
- 4. World Physical Regions:** Characteristics of Physical Regions, Climatic Region, Vegetation Region, Soil Region
- 5. World Human Regions:** Characteristics of Humanistic Regions, Cultural Region, Economic Region, Urban Region, Population Region

### **Selected Readings:**

- Bradshaw, M., White, G.W. and Chacko, E. (2004) *Contemporary World Regional Geography*, McGraw Hill (2<sup>nd</sup> Edition)  
Pulsipher, L.M. and Pulsipher, A. (2006) *World Regional Geography: Global Patterns, Local Lives*, W. H, Freeman and Company (3<sup>rd</sup> Edition)  
De Blij, H.J. and Muller, P.O. (2004) *Geography: Realms, Regions and Concepts*, John Wiley and Sons, Inc. (11<sup>th</sup> Edition)

### **GETh 103 : Introduction to Physical Geography and Environment**

**2 Credit Hour**

1. Definition, Subject matter, Scope and Relation with other subjects
2. Earth as a Planet: Shape and Size; Geographic Grid ; World Time Zone.
3. Earth's Structure
  - 3.1 Internal Structure of the Earth : Crust – composition (sial/sima); Mantle; and Core
  - 3.2 Composition of the earth crust: Rocks and Minerals(Classification and Properties)
4. Processes of Landformation:Endogenic (Diastrophism, Volcanism, Earth Quakes); Exogenic (weathering, Erosion, Mass wasting, Deposition)
5. Endogenic and Exogenic Processes: Driving force: Earth Quakes and Volcanoes: Agents of land sculpture:- River, Glacier, and Wind; Weathering and Erosion; and Mass wasting

6. The Atmosphere: Composition and Structure: Weather and Climate (Factors and Elements)
7. The Hydrosphere: Global Distribution of Water: Hydrological Cycle (ocean water, fresh water); Ocean shape, size and volume
8. The Biosphere: Definition and components; Environmental Factors and Plant Distribution; Animal kingdom

**Selected Readings:**

Robinson, H., Physical Geography, Mac Donald & Evans,  
 Thronbury, W.D., Principles of Geomorphology, John Wile, London.  
 Lake, P. Physical Geography. Macmillan's & Co., Calcutta.  
 Monkhouse, F.J. The Principles of Physical Geography, University of London Press, London.

**GETh 104 : Introduction to Human Geography and Environment**

**2 Credit Hour**

1. Meaning of concepts: Geography, Human Geography and Human Environment: Subject matters and Scope of Human Geography; Human geography and its branches; Development of Human Geography: A historical perspective
2. Relationship between Human Geography and Human Environment: Development of Human Society; Man and Environment Interaction Evolution of Human Society
3. Human Population: Distribution; Factors for Population Distribution; Population Distribution:- Global, Regional and National; Population and Development.
4. Resources and Wealth; Meaning and Concepts of Resources and Wealth; Types and Characteristics of Resources; Alternative Resources
5. Economic Activities and PCE Mechanism: Factors of Production; Economic Activities (Primary, Secondary, Tertiary and Quaternary); Production, Consumption and Exchange (PCE)
6. Human Settlements; Basic Concept of Human Settlements; Types and Characteristics of Settlements

**Selected Readings:**

Taaffe, Edward E.J. (eds.) Geography; Prentice Hall, N.J.  
 Mirshull, Roger M.: The Changing Nature of Geography.  
 Chorley, R. And Peter Haggett (ed.): Models in Geography.  
 Hagget, P.: Locational Analysis in Human Geography.  
 Harvey, David. Explanation in Geography  
 Norton, W. Human Geography  
 Hagget, P Geography: A Modern Synthesis  
 Dictionary of Human Geography  
 James Bird: The Changing Worlds of Geography  
 TIM Unwin: The Place of Geography  
 Arild Holt-Jensen: Geography-History and Concepts (2<sup>nd</sup> ed)

**GETh 105 : Fundamentals of Chemistry in Geography and Environment**

**2 Credit Hour**

1. Environmental Chemistry: Meaning, Scope and Importance.
2. Structure of Atom; Electron, Proton and Neutrons; Atomic number, Atomic mass; Isotopes
3. State of Matters: solid, liquid and gas; changes of state:
4. Elements: Definition, Classification; Properties
5. Oxidation and Reduction: Definition; Balancing Chemical Equations; Titration;
6. Acid and Base: Definition; Properties; Acid-base Equilibrium; Ionic Product of Water;

- Strength of Acid and Base: pH, Acid-Base Titration: Indicator; Buffer Solution
- 7 Biogeochemical cycle: Nitrogen cycle; Carbon cycle, Oxygen cycle;
  8. Chemical pollution of soil: Pesticide; Insecticide; Soiled Waste
  9. Chemical pollution of water: Trace elements; Water quality parameters; Industrial Effluents; Pesticide; Insecticide; Oil Spill; Sewerage
  10. Chemical pollution of Air: Green House Effect; CO<sub>2</sub>, CO, SO<sub>x</sub>, NO<sub>x</sub>, CFC, Acid Rain, Hydrocarbons, Smog, Particulates
  11. Chemical Toxicology: Toxic Chemical in Environment; Effect of Arsenic, Cadmium, Lead, Mercury, and Cyanide
  12. Environmental Pollution and Human Health

**Selected Readings:**

Asthana, D.K. and Asthoma, M (1998) Environment Problems and Solutions, S. Chand and Company Ltd. New Delhi.

O’Riordan, T (1995) Environmental Science for Environmental Management, Longman, New York

White, I.D. Mattershead, D.N. and Harrison, S.J. (1992) Environmental System, Chapman and Hail, London

Smith, P.M. and Warr, K. (1999) Global Environmental Issue, Hodder & Stoughton, London

Miller, G.T (1994) Living in the Environment, ITP, California.

Manahan, S. E. 2009. fundamentals of Environmental Chemistry, Third Edition. CRC Press, Taylor & Francis Group, New York, USA.

**GETh 106 : Fundamentals of English Language**

**2 Credit Hour**

1. Basic Grammar and Sentence Skills; Verbs and tenses; Subject Verb Agreement; Phrases and Clauses; Various sentence-construction problems (run-ons, comma splices, fragments, parallelism errors etc); Punctuation marks
2. Reading Skills; Skimming and scanning; Predicting, Inferring, Analyzing and Interpreting variety of Texts; Speed Reading
3. Listening Skills; Comprehensive and Constructive Listening; Critical and Critical Constructive Listening; Empathetic and Synergistic Listening.
4. Writing Skills; Prewriting Techniques. Cohesion and linking ideas together; Descriptive, Narrative and Argumentative writing styles; Writing Paragraphs using topic sentence; Writing Essays using thesis statement; Writing Abstract and Summary; Writing Research Papers and Proposals.
5. Speaking and Presentation Skills; Techniques of Avoiding Stage Fear. Impromptu speaking, Memorized Presentation, Manuscript-Reading and Extemporaneous Presentation. Seminar Presentation; Methodological Steps toward Proper public speaking; Informative and Persuasive speeches; Speeches of special occasions; General Interview and Job interview Techniques.
6. Developing Geographic Language and Vocabulary; Skill-development in Geographic Expression, Observation, Composition and Report Writing; Language of maps
7. Miscellaneous issues; Familiarizing students with SAT, IELTS and TOEFL systems

**GELb.107 : Fundamentals of Cartography and Map Projection**

**3 Credit Hour**

1. Introduction to Cartography: Definition, History, Importance and Application
2. Maps: Definition, History, Types-based on scale and content.
  - 2.1.Importance and uses of maps
  - 2.2.Basic elements of map: Scale: Definition, Types and Use; Construction of scale-Linear, Comparative and Diagonal
  - 2,3 Enlargement and Reduction of Map; Combining map
  - 2.4.Distance Measurement and Area measurement

3. Map Design and Symbology: Principles of map design; Cartographic Design; International Colour Scheme; Theory, Models and Perception; Typographic Map Production
4. Thematic map: Definition and Concept: Methods/Techniques of Thematic Mapping- Choropleth, Isopleths, Dot, Flow, Proportional symbol, Isarithmic and Diagrammatic method; Cartogram
5. Computer Cartography: Definition, Principles and Use
  - 5.1. Dynamic/Interactive mapping
  - 5.2. Computer Mapping Software
  - 5.3. GIS system: Geo-visualisation
6. Map Projection; Definition and Uses; Classification (Perspective, Non-perspective, Conventional, Cylindrical Conical Zenithal); Geo-referencing
7. Construction of Various Projections (Graphical and Mathematical) along with their Merits and Demerits.
  - 7.1. Cylindrical Equal Area Projection.
  - 7.2. Mercator's Projection
  - 7.3. Conical Projection with one Standard Parallel
  - 7.4. Bonne's Projection
  - 7.5. Zenithal Equal Area Projection

#### **Selected Readings**

Ahmed, K. S., Simple Map Projection  
 Robinson, A. H., Elements of Cartography  
 Singh, R.L., Elements of Practical Geography  
 Bygott, J., AN Introduction to Map Work and Practical Geography  
 Brown, *Map Making*  
 Monkhouse, F.J., Maps and Diagrams  
 Kellaway, G. P., Map Projection

#### **GELb 108: Introduction to Computer in Geography and Environment**

**2 Credit Hour**

The purpose of this course is to expose student to computer basics, computer hardware, computer software and related latest computer technology and word processing

1. Introduction to computer
2. Computer Hardware
3. Computer Software
4. Operating Systems
5. Introduction to Internet
6. Introduction to MS Word
7. Practicing in Typing Master
8. Introduction to Database and MS Excel

#### **Selected Readings:**

Basic Computing: Computer Fundamentals: by iCreate, Inc. (A Non-Profit Organization), Introduction to computer, by Subramanian, N. Peter Norton's Introduction to Computer: by Norton, Peter I ntroduction to Computer: by Norton, Peter  
 Microsoft Office Microsoft Word <http://www.weltppedia.com/> [http://wiki. answers, com/](http://wiki.answers.com/)

#### **GELb 109 : Topographic Surveying**

**2 Credit Hour**

1. Definition of Surveying: Type of Survey: (Geodetic, Plane)
2. Surveying as the Basis of Large Scale Maps
  - 2.1 The Framework of Topographical Maps
  - 2.2 Principles of Triangulation
  - 2.3 Types of Triangulation (Topographical, Principal, Major and Minor)

3: Methods of Surveying

- 3.1 Chain and Tape: Equipments; Recording of Field Data; Tie Line; Principles and Uses; Open and Closed Traverse Surveying; Measuring against Obstacles; Drawing Procedures; Advantages and Disadvantages of Chain and Tape Survey
- 3.2 Plane Table Surveying; Equipments, Method of Preparation; Open and Closed Traverse Surveying; Advantages and Disadvantages of Plane Table Survey
- 3.3 Prismatic Compass; Equipments, Data Recording and Plotting; Advantages and Disadvantages of the Survey

**Selected Readings:**

Shingh, R.L. Elements of Practical Geography.

Keats, J.S. Cartography, London, Longman.

Monkhouse, F.J. Maps and Diagrams.

Robinson, A.H. Elements of Cartography, New York, John Willy and sons.

**GELb 110 : Introduction to Research and Field Studies**

**2 Credit Hour**

- 1. Research: Definition, Types and Importance
- 2. Research Methods and Techniques in Geography and Environmental Studies, Observation; Description; Analysis and Synthesis; Surveying; Mapping
- 3. Sources of Geographic and Environmental Data
  - Major sources: Primary, Secondary
  - Nature of Geographic Data/Information
  - Data Analysis and Presentation
  - (Tables, Maps, Graphs and Photographs)
- 4. Writing References, Notes, Bibliography etc.  
(Library use, literature search and compilation of data from various sources, writing reviews)
- 5. Report Writing;
  - Writing Abstract; Preparing contents; Arranging the body of text; Summarizing and Conclusion;
  - Giving References and bibliography; Adding Annexure/Appendices
  - Presentation of Report.

A daylong fieldtrip to introduce the students on some aspects (physical and human) of geographical research.

**Selected Readings:**

Black, J.A. & Dean, A. Champion. Methods and Issues in Social Research

Moser, C.A. & G. Kalton. Survey Methods in Social Investigation

Turabian, K. L. A Manual of writers of Term Papers, Thesis and Dissertation. The University Press, Chicago.

**GEV 111 : Viva Voce**

**1 Credit Hour**

## MINOR COURSES

### GLT 101: Geology - I

2 Credits Hour

**Geology**---Concepts, Scope; Basic Principles; The Earth---its Internal Structure and Composition; Endogenetic and Exogenetic Geological Processes; Geological Time; Geological-Time Scale; Fossils and Evolution of Life-forms.

**Mineralogy**---Study of the Physical Properties, Chemistry and Classification of Common Rock-forming and Ore Minerals.

**Petrology**: Study of the Structure, Texture, Composition, Classification, Origin, and Mode of Occurrence of Igneous, Sedimentary, and Metamorphic Rocks.

#### Selected Readings:

Beny, L.G. and Mason, B.: Elements of Mineralogy.

Huang W.T.: Petrology.

Read, H.H.: Rutley's Elements of Mineralogy

Tyrell, G.W.: The Principles of Petrology.

Strahier, A.N.: The Earth Science

Spencer, E.W.: Concept of Historical Geology.

### GLP 102: Petrology and Mineralogy Lab

2 Credit Hour

Study of Common (A) Rock-forming and Ore Minerals, and (B) Igneous, Sedimentary, and Metamorphic Rocks in Hand Specimen.

#### Selected Readings:

Berry, MS. and Mason, B.: Elements of Mineralogy

Huang W.T.: Petrology.

Read, M.H.: Rutley's Elements of Mineralogy.

Tyrell, GW.: The Principles of Petrology.

### SWE 101: Introductory Soil-I

2 Credit Hour

**Concepts of soils**: Pedology and Edaphology; foundation of Pedology; Soil as a heterogenous and three dimensional component of the landscape; Spatial variability of soils in relation to landscape.

**Basic terminologies used in Pedology**: Soil Series, Soil Family, Soil Phases, Soil Type, Mapping unit Taxonomic unit, Soil Association, Soil Consociation, Soil Complex, Landscape, Land type, Land form, Soil colour, Profile, Horizon, Layer, Control section, Soil sequence, Pedon, Polypedon, Soil monolith, etc.

#### Volume composition of soils.

#### Evolution and composition of the earth.

**Rocks**: Their formation, nature and classification.

**Minerals**: Their formation, characteristics and classification; Silicate structure.

**Weathering of rocks and minerals**: Physical and Biogeochemical weathering process; Weathering sequences and results.

**Typical soil profile**: Master horizons and their formation; Importance of soil profile study; Soil solum and Regolith.

#### Factors of soil formation

**Fundamental processes of soil formation**: Humification, Littering, Eluviation, Illuviation, Calcification, Decalcification, Podzolization, Laterization, Gleization, Ferrugination, Ferrollysis, Salinization , Desalinization, Alkalization, Dealkalization , Pedoturbation, Lassivage etc.



**Physical nature of the soil separates:** Particle size distribution, soil textural classes; Soil Structure; classification and importance; Soil water; Forces of retention and classification, soil moisture constants, Soil air; composition and importance; Soil color: fundamental ideas and importance, Soil temperature-importance and distribution.

**Selected Readings:**

The Nature and Properties of Soils- Brady and Weil  
World Soils-EM Bridges  
The Soil Resoure – Origin and Behavior –H. Jenny  
Pedology; Concepts and Applicatoons-J.Sehgal  
Soil Genesis and Classification- S.W. Buol. J.D. Hole and R. J. McCracken

**SWE 102: Introductory Soil II**

**2 Credit Hour**

**Soil Chemistry and Soil Microbiology:** An introduction to the course; Importance; Interrelationship; relationship with other branches of Soil Science, Water and Atmospheric studies.

**Fundamental** chemical, physical and biochemical processes in relation to the study of soil water and atmospheric sciences.

**Chemical aspect** of three phases of soil- interrelationship among the three phases of soil and the phases of soil in relation to plant growth; Chemical nature and properties of soil components-,Essential elements for plant growth.

**Soil organic matter-** sources and chemical constituents of plant tissues and soil organic matter. Organic compounds carbohydrates, protein, amino acids, nucleic acid, amino sugars, lignin, lipids, pectin, chitin, hormones, and enzymes.

**Soil air** - chemical composition and variations of gaseous components. Impact of gaseous components on soil properties and environmental pollution.

**Soil solution-** Structure and properties of water molecule; Chemical nature o fions; composition and concentration of soil solution; importance.

Sol pH- pH scale; classification of soil on the basis of pH values; Buffer solution and buffering.

Soil organisms: Scope of Microbiology in relation to the study of soil, water and atmosphere sciences. Soil Biota; Morphology, function and importance of soil flora.

**Soil as a source of energy** and nutrients to the biota. Nutritional division; Temperature and oxygen requirements; Cultivation of microorganisms.

**Selected Readings:**

The Nature and Properties of Soil-N.C.Brady and R.R.Weil  
Principles of soil Chemistry- K.m. Tan  
A Text Book of Soil Science-Daji  
Chemistry-R. Harwood  
Introduction to Plant Physiology-Noggle and Fritz  
Soil ecology-Ken Killham  
Microbiolohgy- MJPelczar Jr, E. C. S. Chan and N. R. Kreig  
Soil and Water Chemistry- M. E. Essington

**Sociology Part-I**

**4 Credit Hour**

**1. Introducing Sociology:**

- 1 .1 Definition, Scope & relationship with other disciplines
- 1.2 Development of Sociological Thinking: The fourfold Origin
- 1 .3 The Sociological Perspectives.

**2. Doing Sociology:**

- 2.1 Sociological questions: Scientific Approach, Research Process.

2.2 Research methods: Ethnography, Surveys, Experiments, Life histories, Comparative Research, Historical Analysis and Participant Observation.

2.3 Research in the Real World.

### **3. Theoretical Thinking in Sociology:**

3.1 Theoretical Issues: Structure and Action, Consensus and Conflict, The Issue of Gender, The Shaping of the Modern World and Postmodernism.

3.2 Classical Theorists: Auguste Comte, Herbert Spencer, Karl Marx, Emile Durkheim, Max Weber, Velfredo Pareto

3.3 Contemporary Sociologists: Michel Foucault, Jurgen Habermas, Ulrich Beck, Manuel Castells and Anthony Giddens.

### **4. Globalization and the Changing World:**

4.1 Types of Society: A Disappearing World, Modern World and Global Development.

4.2 Social Change: Definition, Influence and Change in modern period

4.3 Globalization: Factors, Debate and Impact:

### **5. Culture, Society and Socialization:**

5.1 Culture: Definition, Element, Types and Cultural Lag

5.2 Socialization: Definition, Process, Agencies and Theories.

5.3 Gender Socialization

### **6. Families, Education and Religion:**

6.1 Forms, Functions and Theoretical Perspectives of Family.

6.2 Theories of Schooling and Inequality.

6.3 Sociological Theories and Ideas of Religion.

### **7. Crime and Deviance:**

7.1 Basic ideas and concepts of Crime and Deviance

7.2 Theories of Crime: Functionalist, Interactionist, Conflict and Control theories.

7.3 Victims and Perpetrators of Crime.

### **8. Stratification and Class:**

8.1 Definition and Systems of Stratification

8.2 Theories of Class: Karl Marx, Max Weber, Erik O. Wright, John Goldthorpe

8.3 Social Mobility: Types and Consequence

### **9. Poverty and Social Exclusion:**

9.1 Definition and Types of Poverty

9.2 Measuring Poverty: Relative Deprivation, Breadline Britain and Social exclusion

9.3 Who is poor? Poverty and Social Mobility

### **10. Cities, Population and Environment:**

10.1 Cities: History, Development and Global cities

10.2 Population: Concepts and Theories

10.3 Environment: Sociological Issue, Sustainable Development and Global Warming

**Selected Readings:**

Giddens, A.: Sociology, Polity Publications

Scheafer R : Sociology,

**Introduction to Psychology****4 Credit Hour****1. Psychology**

Definition and Goals of Psychology; Perspectives of Psychology; Subfields of Psychology; Methods of Psychology.

**2. Biological Basis of Behavior**

The Major divisions of the Nervous System; The Central Nervous System- Brain and Spinal Cord; The Peripheral Nervous System- The Somatic and the Autonomic Nervous System.

**3. Perception**

Definition of Perception; Form Perception, The principles of Perceptual Organization; Depth perception- Monocular and Binocular cues of Depth Perception; Perceptual Constancy.

**4. Learning**

Definition of Learning; Classical Conditioning; Operant Conditioning; Reinforcement and Punishment; Schedules of Reinforcement; Cognitive Learning- Cognitive map, Latent learning, Observational Learning.

**5. Memory and Forgetting**

Definition of Memory; Types of Memory; Definition of Forgetting; Theories of Forgetting.

**6. Motivation and Emotion**

Definition of Motivation; Classification of Motives; Theories of Motivation; Definition of Emotion; Kinds of Emotion; Theories of emotion.

**7. Personality**

Definition of Personality; The structure of Personality; The Development of Personality; Measurement of Personality- Projective tests, Personality inventories.

**8. Intelligence**

Definition of Intelligence; Measurement of Intelligence- Binet-Simon Intelligence Scale, Wechsler Intelligence Scales; Individual and Group test of intelligence.

**Selected Readings:**

Crider, A.B., Goethals, G.R., Roberts, D, Kavanaugh, R.D., Solomon, P.R. Psychology Scott, Foresman(1993), PSYCHOLOGY(Latest edition) New York: Harper Collins college publishers.

Feldman, R.S.(2002), UNDERSTANDING PSYCHOLOGY(Latest edition) New York: McGraw Hill.

## 2nd Year B.Sc. (Honours) Course (Session : 2018-2019 and 2019-2020)

Course Code	Course Title	Credit Hours
GETh 201	Geography of Soils	2
GETh 202	Biogeography	2
GETh 203	Oceanography and Marine Environment	2
GETh 204	Population Geography	3
GETh 205	Economic Geography-I	2
GETh 206	Cultural Geography	3
GETh 207	Quantitative Techniques in Geography and Environment – I	2
GELb 208	Introduction to GIS and Computer Cartography	2
GELb 209	Geomatic Surveying	2
GELb 210	Remote Sensing-I: Fundamentals	2
GELb 211	Research Methods and Field Study in Human Geography and Environment – I	2
GEV 212	Viva Voce	2
	<b>Total credit</b>	26
	<b>Minor Course (For Science Streams)</b>	
	GLT 201 : Geology II	2
	GLP 202 : Geological Maps Lab	2
	SWE 202: Soil Physics	4
	BOT 2003 : Ecology Environment and Plants	4
	<b>Minor Course (For other Streams)</b>	
	Sociology of Bangladesh	4
	Social Psychology	4
	Economics/International Relations	4
	<b>Total (Major and Minor)</b>	38

### **GETh 201 : Geography of Soils**

**2 Credit Hour**

1. Nature and Field of Soil Geography.
2. Components / Compositions of soil and Functions of Soil in Ecosystem.
3. Physical & Chemical Properties of Soil: Mineral Matter, Texture, Structure, Thickness, Color, Air, Water, Temperature, Density, Soil Nutrients, Soil PH, Lime Content, Soil Colliods, Soil reaction, Buffering, Ion exchange, Soil salinity.
4. Organic Properties of Soil: Functions and Composition of Organic Matter, Humus and Humification process, Essential Plant Nutrients in soil, Soil Fertility and Productivity, Soil Flora and Fauna, Nitrogen Fixation.
5. Formation of Soils : Factors/ Agents of soil formation, Soil Profile, Soil forming Processes/Pedogenic Processes ( Laterization, Podsolization, Calcification Gleization and Salinization).
6. Soil Erosion & Conservation : Causes and Factors of soil erosion, Soil Degradation, Controlling measures of Soil Loss & Conservation.
7. Soil Classification : Overview of Soil Classifications, Great Soil Groups of the World (Zonal, Azonal & Intrazonal), USDA Soil Classification Systems.

#### **Selected Readings**

1. Brady, N.C. and Weil, R. (2010). Elements of Nature and Properties of Soils. 3<sup>rd</sup> ed. Prentice Hall USA. ISBN - 10 : 0135014336

2. Brady, Nyle C and Weil, Ray R (2002). The Nature and Properties of Soils. 13th ed., Pearson-Prentice Hall: USA
1. Park, Chris (2000). The Environment: Principles & Application. Routledge : London & N.Y.
2. Robinson, H. (1982). Biogeography. Part Two: "Soils-Their Nature, Classification and Use" , MacDonal & Evans : London.
3. Buchman, Harry O and Nyle c Brady (1971). The Nature and Properties of Soils. Eurasia Publishing: New Delhi.
4. Strahler, N. Arthur and Strahler, H. Alien. Modern Physical Geography. John Wiley : N.Y.

### **GETh 202 : Biogeography**

**2 Credit Hour**

1. Biogeography : Field, Scope and Development
2. Biosphere: Definition, Limit and Composition of Biosphere, Sub-division of Biosphere
3. Ecosystem: Definition & Components, Function and Process of Ecosystem (Energy flow and Nutrients), Food Chain & Trophic Levels, Food Web
4. Evolution & Classification of Plants: Taxonomic, Ecological, Climatic Grimes classification, Environmental Factors of plant growth.
5. Geographical Distribution of Plants: Factors & Agents of Plant Dispersal, Types of Distribution of Plants, Floristic Region.
6. Biochore & Formation classes; Forest, Savana, Grassland & Desert.
7. Dynamics of Vegetation: Plant Succession (Types, Forms, Stages)
8. Major Biomes of the world,
9. Biodiversity: Definition, Types, Loss of Biodiversity, Causes of Loss, Conservation.
- 10.. Zoogeography; Animal Dispersal & Migration; Zoogeographical Realm

#### **Selected Readings:**

- Haggett, Richard John (1998). Fundamentals of Biogeography. Routledge: London and New York.
- Mathur, H.S. (1988). Essentials of Biogeography. Pointers Publishers: Jaipur.
- Pears, Nigel (1985). Basic Biogeography. Longman: New York.
- Singh, Savindra (1991). Environmental Geography. Prayag Pustak Bhawan: Allahabad.
- Dansereau, Pierre (1957). Biogeography : An Ecological Perspective. Ronald Press, New York.
- Edwards, K.C. "The Importance of Biogeography". Geography, Vol. XLIX, 1964, pp. 85-97
- Newbigin, M. I (1936) Plant and Animal Geography. Methuen
- Robinson, H. (1982) Biogeography. Macdonald & Evans: London
- Darlington, P. (1957). Zoogeography. Methuen: New York.
- Park, Chin. (2000) The Environment: Principles & Applications, Routledge: New York.

### **GETh 203 : Oceanography and Marine Environment**

**2 Credit Hour**

- 1 Oceanography: Introduction, Definition, Scope and relation with other subjects.
- 2 Relief of the Ocean: Continental Shelves & Slope, Ocean floor of the Atlantic, Pacific and Indian Ocean

- 3 Ocean Sediments: Source of Sediments, Types, Characteristics, Depositional Environments.
- 4 Ocean Temperature:- Temperature Change, Causes, Vertical and Horizontal Distribution, Implication.
- 5 Ocean Salinity: Salinity Change, Causes, Distribution and Implication.
- 6 Ocean Currents: Causes, Types, Ocean Current in Atlantic, Pacific and Indian Ocean.
- 7 Tide: Causes and Effects.
- 8 Waves: Causes, Characteristics, Wave Actions.
- 9 Storm surges and cyclones, characteristics, environmental consequences and management.
- 10 Sea-level Change: Definition, Causes, Past, Present and Future Trends of S. L. Changes, Consequences of S. L. changes.
- 11 Marine Environment: Marine climatic Zone, EL-Nino, La-Nina Ocean pollution, Man-Ocean relation, Ocean Policy, Organization.
- 12 Ocean Resources: Fisheries, Minerals and Power resources, Marine resources of Bangladesh.
- 13 Coral Reef: Types, Formation, Characteristics, Importance and Global distribution,
- 14 Ocean Policy: Law of the Ocean, International Organization, EEZ. Ocean Resource Utilization
- 15 Bay of Bengal with emphasis on EEZ of Bangladesh and estuaries: Resource Utilization, SL. Change of Bangladesh. Govt. policy on Bay of Bengal.

**Selected Readings:**

- Bhatt, J.J., Oceanography, D. Van Nostrand Company, New York.  
 King, C.A.M., Oceanography for Geographers, Edwin Arnold Publishers Ltd. London  
 Sharma, R.C. and Vatal, M. Oceanography for Geographers, Chaitanya Publishing House, Allahabad, India.  
 Carson, R.J., The Sea Around, Staples Press Ltd. London.  
 Engel, L., The Sea, Time Incorporated, London.

**GETh 204 : Population Geography**

**3 Credit Hour**

1. Definition, Scope and Development of Population Geography.
2. Data Sources : Primary and Secondary
  - 2.1 Errors in Data
3. Approaches to Population Geography
  - 3.1 Trewartha
  - 3.2 Hagerstrand
  - 3.3 Zelinsky
4. Special Aspects of Population Geography
  - 4.1 Determinants
  - 4.2 Redistribution
5. Patterns of Population Distribution
  - 5.1 Biological : Age, Sex, Race
  - 5.2 Social : Marital Status, Language, Religion, Education

- 5.3 Occupation : Income
- 5.4 Rural-Urban Residence
- 6. World Population Growth : Pattern in the Western and Eastern World
- 7. Population Growth Theories
  - 7.1 Malthus
  - 7.2 Optimum Population
  - 7.3 Demographic Transition Theory
  - 7.4 Boserup's Hypothesis
- 8. Population Dynamics
  - 8.1 Fertility and Proximate Determinants of Fertility
  - 8.2 Mortality
  - 8.3 Migration and its Determinants, Processes and Patterns of Migration
    - 8.3.1 Elements at the Micro, Meso and Macro Level
    - 8.3.2 Global and Regional
- 9. Population Projection
- 10. Life Table Analysis
- 11. Population and Resources
- 12. Population Policy
- 13. Population of Bangladesh : A Geographical Perspective

### **Selected Readings**

- Clark, J.J. (2005) *Population Geography*
- Jones, H. (2004) *Population Geography*, Second edition.
- Zilensky, Wilber (2001) *A Prologue to Population Geography*
- Shryock, Henry S. & Jacob S. Siegel (2002) *The Methods and Materials of Demography*, Academic Press INC, New York.
- Lucas, David & et.al (1999) *Beginning Population Studies*, The Australian National University, Canberra.
- G.J. Demko, H.M. Rose, A.A. Schnell (2000) *Population Geography : A Reader*
- Bogue, D.J. (2000) *Principles of Demography*
- Ehrlich, P.R. & A.H. Ehrlich (2000) *Population Resources and Environment*.

### **GETh 205: Economic Geography-1**

**2 Credit Hour**

Economic Geography: Definition, Historical Underpinnings, Concept of Economic Men and their Characteristics.

Economic Activities and Sectors.

PCE Mechanism, Production, Factors of Production, Form & Place Utility.

Von Thunen's Agricultural Land Use Model: Economic Rent, Isotropic Plain, Production Cost, The Market Price and the Transport Cost.

Weber's Model of Industrial Location: Transport Cost, Labor Cost, Agglomeration Economies, Spatial Margins to Profitability.

Christaller's Central Place Theory: Threshold, Range of Goods, The Marketing Principle (K=3 System), The Transportation Principle (K=4 System), The Administrative Principle (K=7 System)

Population, Resource, and Economic Interaction: Malthus and the Problem of Overpopulation, Trends and Geographic Distribution of Population and Growth, The Demographic Transition Model

**Selected Readings:**

- Goudie, A. (1993): *The Nature of the Environment*, Blackwell Publishers, UK.
- Haggett, P. (1975): *Geography: A Modern Synthesis*, Harper & Row/New York.
- Hanink, Dean. (1997). *Principles and Applications of Economic Geography: Economy, Policy, Environment*. Toronto: John Wiley and Sons, Inc.
- Hartshorn, T. A. and Alexander, J.W (1994): *Economic Geography*, Prentice - Hall, New Delhi.
- Jhingan, M. L. (1994): *The Economics of Development & Planning*, Konark Publishers, Delhi.
- Barnes, T. J. (1996). *Logics of dislocation: models, metaphors and meanings of economic space*. New York: Guilford.
- Cook, P. (2004). Follow the thing: Papaya. *Antipode* 36, 642-64.
- Dicken, P. (2007). *Global shift: Mapping the changing contours of the world economy*. New York: Guilford.
- Gibson-Graham, J.-K. (1996). *The end of capitalism (as we knew it): A feminist critique of political economy*. Oxford: Blackwell.
- Harvey, D. (1982). *The limits to capital*. Chicago: University of Chicago Press.
- Leyshon, A. and Thrift, N. 1997. *Money.space: Geographies of monetary transformation*. London: Routledge.
- Massey, D. (1984). *Spatial divisions of labour: Social structures and the geography of production*. London: MacMillan.
- McDowell, L. (1997). *Capital culture: Gender at work in the city*. Oxford: Blackwell.
- Peck, J. 1996. *Work place: Social regulation of labor markets*. New York: Guilford.
- Saxenian, A. (1994). *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
- Schoenberger, E. (1997). *The cultural crisis of the firm*. Oxford: Blackwell.
- Scott, A. J. (1988). Flexible production systems and regional development: the rise of new industrial spaces in North America and Western Europe. *International Journal of Urban and Regional Research* 12,171-85.

**GETh 206: Cultural Geography****3 Credit Hour**

1. Scope, Themes and Methods of Cultural Geography
2. Culture: Nature and Types
3. Processes of Culture Change
4. Evolution of Mankind: Australopithecus to Homo Sapiens Sapiens
5. Evolution of Material Culture: Stone Age (Paleolithic, Mesolithic and Neolithic); Age of Metals
6. Evolution of Livelihood: Domestication of Plants and Animals; Rise of Urbanism; Industrial Revolution; Post Industrial culture and e-culture
7. Major Extinct Culture Hearths: Mesopotamia; Nile Valley; Indus Valley; Chinese, Maya; Aztech and Inca
8. Geographic Dimensions of Race, Ethnicity, Religion, Language with examples from Bangladesh
9. Cultural Heritage and Conservation

**Selected Readings**

- Wagner & Mikesell (eds.), Readings in Cultural Geography
- Broek & Webb, A Geography of Mankind



de Blij, Harm J., Human Geography: Culture, Society and Space

Hoebel, E.A., Anthropology: The Study of Man

Griffith Taylor, Geography in the 20th Century

Spencer, J. E. & Thomas (Jr.) W. L., Cultural Geography

দাসগুপ্ত, অমল, মানুষের ঠিকানা, কলিকাতা : রাখাল সেন

রশীদ, কে. বি. এস. সাংস্কৃতিক ভূগোল, ঢাকা : বাংলা একাডেমী

বাকী, আ. সাংস্কৃতিক ভূগোল, ঢাকা : গ্লোব প্রকাশনী

### **GETh 207: Quantitative Techniques in Geography and Environment – I**

**2 Credit Hour**

1. Basic Mathematical and Statistical Concepts in Geography
2. Number System: Natural Numbers; Whole Numbers; Prime Numbers and Real Numbers
3. Introduction to Set Theory
4. Simple Arithmetic Operation: Rounding of Data; Scientific Notations; Decimals; Fractions; Equations and Inequalities; Conversion of Measurement Units Between Imperial and SI systems
5. Variable; Discrete; Continuous
6. Levels of Measurement: Nominal Scale; Ordinal Scale; Interval Scale and Ratio Scale
7. Frequency Distribution; Frequency Table; Histograms; Polygons; Ogives; Forms of Distribution; Moments; Skewness; Kurtosis
8. Measures of Central Tendency; Mean; Median; Mode
9. Measures of Dispersion (Both Absolute and Relative):  
Absolute Measures (Range; Mean Deviation; Quartile Deviation; Standard Deviation)  
Relative Measures (Co-efficient of Variation; Co-efficient of Mean Deviation; Co-efficient of Quartile Deviation)
10. Indices of Concentration and Dispersion and Time Series Analysis

#### **Selected Readings**

Cole, J.P. & King, C.A. M. Quantitative Geography - Techniques and Theories in Geography, Johns Wiley & Sons Ltd, USA.

Johnston, R.J. Multivariate Statistical Analysis in Geography, Longman, USA

Mahmood, A. Statistical Methods in Geographical Studies, Rajesh Publications, India.

Taylor, P. J. Quantitative Methods in Geography. Houghton Mifflin Company, London.

Unwin, D. Introductory Spatial Analysis, Methuen, New York, USA.

Yeates, M. An Introduction to quantitative Analysis in Human Geography, McGraw Hill Inc.

### **GELb 208: Introduction to of GIS and Computer Cartography**

**2 Credit Hour**

#### **1. Introduction to GIS**

Introduction: Definitions

Components: Computer Systems and Software; Spatial Data; Data Management & Analysis Procedures; People and GIS.

Applications: Urban Planning, Environmental Management, Health Care Planning, Land Information System, Disaster Management etc.

GIS vs. Computer Cartography

## 2. **Spatial Data**

Introduction: Maps and Spatial Data: Purpose; Scale; Spatial Entities; Generalization; Projections; Spatial Referencing; Topology; Fundamental Properties of Geographic Objects: Size, Distribution, Pattern, Symbolization and Map Design Issues & Principles

## 3. **Spatial Data Model**

Introduction

Entity Definition: Point, Line, Area, Network, Surface

Spatial Data Models: Raster data Structures; Vector data Structures

Attribute Data Management

## 4. **Working with ArcGIS:**

The objective of this section is to apply various cartographic techniques on supplied spatial and attribute data. The students will learn the basics of map layout and the basic cartographic techniques using *ArcCatalog* and *ArcMap* modules of **ArcGIS**. They will prepare layout maps using cartographic techniques like Line Graph, Bar Graph, Pie-diagram, Choropleth Map, Isopleth Map, Dot Map and Maps with Proportional Squares, Maps with Cartograms. They will prepare Layouts with, Scale bar, Legends, North Lines, Titles and Annotations.

Exercises (from **Using ArcCatalog, Using ArcMap**)

a) Creating Maps   b) Managing Layers   c) Symbolizing Data

d) Labeling Maps with Texts & Graphics   e) Creating Graphs   f) Laying out and Printing Maps.

### **Selected Readings:**

Haywood, I, Cornelius. S, Carver. S, *An Introduction to Geographical Information Systems*, Longman, 1999

Burrough P.A. & McDonnell, *Principles of Geographical Information Systems*; Oxford University Press, 1998

Stan Arnoff, *Geographic Information Systems: A Management Perspective*, WDL Publications, Ottawa. 1995.

Taylor, D.R.F., *Geographic Information Systems: The Microcomputer and Modern Cartography*, Pergamon Press, Oxford, 1991

Michael Minami, *Using ArcMap*, ESRI, USA, 2000.

Aleta Vienneau, *Using ArcCatalog*, ESRI, USA, 2000.

### **GELb 209 : Geomatic Survey-II**

**2 Credit Hour**

1. Introduction: Principles and Concepts of Geomatic survey
2. Levels and leveling: Definition, classification, terminology; Adjustment of level; Procedure of leveling operation; Effect of Curvature & refraction on leveling; Errors in leveling; Types of leveling.
3. Contouring: Definition; Characteristics of Contour; Methods of Contouring.
4. Introduction to Total Station Survey: Introduction to the machine; Setting up the machine; Methods of Angle Measurement; Methods of Coordinate Measurement; Principles of Operation
5. Introduction to GPS Survey; Working principles of GPS receiver; Different features of GPS receiver; Operational processes related to GPS survey

### **Suggested Readings:**

Engr. Ismail Hossain & Md. Nuruddin, *Advanced Surveying* Porosh Prokashon, Dhaka

Engr. M. Shahjahan & Eng. M.A.Aziz, *A Text Book of Surveying*, Hafiz Book Center, New Market, Dhaka  
J.Uren and W.F.Price 2006 *Surveying for Engineers*; Palgrave, Macmillan  
Barry F. Kavanagh, 2003 Prentice Hall

## **GELb 210 : Remote Sensing-I: Fundamentals**

**2 Credit Hour**

### ***Introduction and History***

Definition and Scope, Satellite Remote Sensing vs. Aerial Photography, Remote Sensing data acquisition, stages of remote sensing, historical development of remote sensing

#### ***Labs:***

1. Introduction with Remotely Sensed Image and Aerial Photography
2. Remote sensing data sources and acquisition process
3. Introduction with remote sensing software (available in the labs) (main functions, menus, GUI etc.)

### ***Physics of Remote Sensing and EMR Interactions***

Electromagnetic Radiation (EMR), Electromagnetic Spectrum, EMR Quantities, Radiant Energy, Radiant Flux, Irradiance, Existence, Solid Angle, Radiant Intensity, Radiance, Spectral Quantities, Radiation Laws, Planck's, Stefan, Boltzman and Kirchoff's Laws, Black-body Radiation, Interaction with Atmosphere, Atmospheric haze, Scattering and Contrast Reduction, Spectral Signature, Hemispheric Reflectance, Transmittance and Absorption.

#### ***Labs:***

4. Principles of Electromagnetic Radiation, Atmospheric windows, Atmospheric blinds
5. EMR Reflection, Emission, Scattering and Absorption and Albedo
6. Spectral Signature of Soil, Water and Vegetation

### ***Platforms, Sensors and Resolution***

Platforms: Ground base, air borne, space borne, Sensors: Types of Sensors; Optical, Thermal, and microwave: sensor systems: Whiskbroom and push broom, Sensors used in NASA, IRS, Landsat, SPOT Satellites, IKONOS, QUICK Bird, Resolutions: Spatial, Spectral, temporal and radiometric.

#### ***Labs:***

7. Image Resolution: Spatial, Spectral, Radiometric and Temporal
8. Comparison of Resolution between different types of satellite imagery

### ***Aerial Photographs and Photogrammetry***

Introduction to aerial photography – Basic information and specifications of aerial photographs, Types of aerial photographs, Geometry of Aerial Photographs, Stereovision, Stereoscope, Relief displacement of vertical features and its determination, Vertical exaggeration and slopes – Factor affecting vertical exaggeration and its determination Definition and terms in Photogrammetry, Introduction to digital photogrammetry- Orthophotos and digital orthophotography

#### ***Labs:***

9. Metrics of Aerial Photography: Scale, Image overlapping, Aerial mosaics
10. Making measurements from aerial photography (object's location, distance, height measurement etc)

### ***Earth Resource Satellites***

Definitions and characteristics, Sun-synchronous and geostationary satellites, NOAA Series, Landsat series, IRS series, satellite data types: FCC and PAN, MSS, HS, Future satellites

11. Characteristics and uses of Visible and IR Imagery, Thermal and Microwave imagery
12. Composition of True Color Image and False Color Image

### ***Image Interpretation***

Introduction; Manual interpretation Vs Digital image processing; Elements of image interpretation, Factors affecting image interpretation, Image interpretation keys, Multi spectral concepts in image interpretation.

#### ***Labs:***

13. Visual Interpretation of Satellite Images and Aerial Photographs, Use of collateral information
14. Introduction to Digital Satellite image by Using Software (image information, Histogram etc)

### ***Application Areas of Remote Sensing***

Geosphere: Imaging spectrometry and geological applications, Hydrosphere: Imaging spectrometry of water, Biosphere: Imaging spectrometry of vegetation, Atmosphere, Thermal imaging, Global cycles and change detection

#### ***Labs:***

15. Applications of Remote Sensing: Web Search (Institution/Research Project based applications)
16. Exercise on a specific area of remote sensing application (based on research articles)

### ***Selected Readings:***

John R. Jensen, *Introduction to Image Processing*

Lillesand and Kiefer, *Remote Sensing and Image Interpretation*

David Campbell, *Introduction to Remote Sensing*

### **GELb 211 : Research Methods and Field Study in Human Geography and Environment – I 2 Credit Hour**

1. Selecting and Defining Research Problem
2. Preparing Research Design/Outline
3. Reviewing Literatures
4. Data Collection in Human Geography & Environment: Field Survey and Sampling. Selection of Sites, Questionnaire Designing and Interviewing Techniques. Observation, Field Recording Techniques, Rapid Geographical Appraisal (RGA).
5. Analyzing & Interpretation of Data ; Data Processing, Analysis and Interpretation
6. Designing and Writing the Report: Report Writing based on filed survey on any Research Issue on Human Geography and Environment.
7. References: Techniques, Footnotes, Bibliography sources.

### ***Suggested Readings:***

1. Cargill, M. and O'Connor, P., 2009. *Writing Scientific Research Articles: Strategy & Steps*, Wiley-Blackwell Inc., Australia.
2. Chapin, P.G., 2004. **Research Projects and Research Proposals**, Cambridge University Press, Cambridge, UK.
3. Corbetta, P., 2003. *Social Research: Theory, Methods and Techniques*, Sage Publications, London.
4. Crano, W.D. and Brewer, M.B., 2002. *Principles and Methods of Social Research*, 2<sup>nd</sup> Edition, Lawrence Erlbaum Associates, Publishers, London.
5. Hoggart, K., Lees, L. and Davies, A., 2002. *Researching Human Geography*, Aronld, London.

6. Montello, D.R. and Sutton, P.G., 2006. *An Introduction to Scientific Research Methods in Geography*, Sage Publications, London.
7. Patton, M.Q., 2002. *Qualitative Research & Evaluation Methods*, Sage Publications, London.

**GEV 212 : Viva Voce**

**2 Credit Hour**

## **MINOR COURSES**

**GLT 201: Geology II**

**2 Credits**

**Stratigraphy:** Introduction; Scope; Basic Concepts of Stratigraphy. Laws of Stratigraphy; Hierarchical Stratigraphic Subdivisions; Depositional Environments; Facies; Correlation. Geology and Stratigraphy of Bangladesh.

**Structural Geology:** Introduction; Scope; Physical Properties of Rocks; Study of Nomenclature, Geometry, Classification, and Origin of Common Macroscopic Structures, viz., Fold, Fault, Joints, and Unconformity.

**Economic Geology:** Introduction; Scope; Study of the Economic Mineral Deposits of Bangladesh.

**Reference Books:**

Dunbar, C.O. and Rodgers, J.: Principles of Stratigraphy.

Khan, F.H.: Geology of Bangladesh.

Billing, M.P.: Structural Geology.

Imam, M.B.: Mineral Resources of Bangladesh (in Bangla).

Imam, B.: Energy Resources of Bangladesh.

**GLP 202: Geological Maps Lab**

**2 Credits**

Maps and Map Projections; Map Scales and their Computations; Map Reproduction: Enlargement and Reduction at different scales; Bearing, Azimuth, Distance, Plotting of Location and Data; Contour Maps and Profile Constructions; Geological Maps and their Cross Sections; Study of Topographic Maps.

**Reference Books:**

Blyth, F.G.: Geological Maps and Their Interpretation.

Platt, J.L.: Selected Exercises upon Geological Maps

Simpson, B.: Geological Maps.

**SWE 202: Soil Physics**

**4 credit**

**Soil Physics in Perspective:** Definition of Soil Physics, History of Soil Physics; Soil Physical properties.

**Phases of Soil:** Soil - a three-phase disperse system:

Description of the three phases; Mass and volume relations of soil constituents.

**The solid phase:**

Texture – Definition, Primary particles; specific surface of soil particles; particle size analysis and expression of results, Stokes' law, Determination of Textural class of a soil.

Structure – Definition, Classification, Genesis, and agricultural significance of soil structure.

Soil Consistence - Atterberg's constants and their practical significance.

Soil Compaction – Occurrence of soil compaction in agricultural fields, Consequences of soil compaction, Control of soil compaction.

**The Liquid phase:**

Molecular properties of water - Structure. H-bonding, States of water.

Fluid properties of water - Surface tension, Capillarity, Viscosity, Density, Derivation of capillary rise equation.

Soil water content Definitions and measurement.

Energy state of water in soil - Soil water potential -definition, components, measurement.

Water retention in soil – Water release curve, hysteresis.

Water movement in soil - Saturated flow, Poiseuille's equation, Darcy's law, Water flux through a uniform homogeneous soil profile, Flux through a layered soil profile, Hydraulic conductivity, Determination of saturated hydraulic conductivity in the laboratory.

**The Gaseous Phase:** Composition of soil air and atmospheric air, Aeration, Mechanisms of soil gas exchange.

**Soil Temperature:** Introduction, Heat capacity, Thermal conductivity, Thermal diffusivity, Factors affecting soil temperature.

**Soil Colour:** Causes and significance of soil color, Munsell's Colour Chart.

**Books Recommended:**

Environmental Soil Physics – Daniel Hillel

Soil Physics Agricultural and Environmental Applications – H. Dan Scott

Soil Physics – Helmut Kahnke.

Soil Physics – L.D. Baver, B. H. Gardner and W.R. Gardner

Methods of Soil Analysis, Part I – C.A. Black and others

**BOT 2003: Ecology, Environment and Plants (Full Marks: 100)**

**4 Credit Hour**

**A. Enecology (Vegetation Ecology):**

1. History. Definition, Scope and sub-divisions of Ecology. Environment and Plants of Hydrophytes, Xerophytes and Halophytes: Their ecological features.
2. Plant succession: Types and Causes of Succession.
3. Methods of Studying Vegetation; Life Form.
4. Ecosystem: classification, structure and components of ecosystem, food chain and food web. energy and mineral movement in ecosystem.
5. Forest Ecology: Brief description of Sundarban mangrove and deciduous forests of Bangladesh; dominant plants.
6. Brief account of Phytogeographical regions of the world.
7. Sampling, Tests of comparison and application of quadrat measures, vegetation analysis and Random sampling.

**B. Autecology (Physiological Ecology)**

1. The environment of plants: The hydrosphere, the biosphere.
2. The role of green plants in nature with reference to: (i) The sun- thermonuclear energy source, (ii) Radiant energy, (iii) Human population and food supply, (iv) CO<sub>2</sub> and world climate.
3. Soil environment: Physical aspects and Chemical aspects; distribution of plants.
4. Energy Environment: Energy Budget of different climatic zone.

5. Sources of salinity: classification of saline habitat.
6. Biogeochemical cycles: Definition, Types of biogeochemical cycle, water and carbon cycles.
7. Biodiversity: What is biodiversity, Causes of the loss and degradation of biodiversity, species diversity analysis.

### **C. Environment**

1. Water Resources, the global picture and the environment.
2. Green House Gases, Ozone depletion and CFC, CFC use in Bangladesh.
3. Climate Change: Causes and evidence.

### **Practical (Marks: 20)**

1. Field note book to study the seasonal variation of vegetation and habitats.
2. Morphology and anatomy of hydrophytes and xerophytes.
3. Determination of pH in water and soil samples.
4. Determination of dissolved oxygen (DO) in water sample.
5. Determination of salinity in water samples.
6. Vegetation analysis.
7. Identification of forest plants from herbarium sheets.

### **Selected Readings:**

- Bannister, P. I 1976. Introduction to Physiological Plant Ecology. Black-well Scientific Publication.
- Barbour, M.G. and Burk, J.H. 1987. Terrestrial Ecology. The Benjamin Publishing Company.
- Chiras, D. D. 1985. Environmental Science. The Benjamin Publishing Co. Inc.
- Daubenmire, R. 1978. Plant Geography. Academy Press.
- Etherington, J.R. 1971. Environment and Plant Ecology. John Wiley & Sons Inc., NY.
- Gates, D. M. 1967. Energy Exchange in the biosphere. Harper International.
- Gates, D. M. 1993. Climate Change. Sinaur Associates Inc.
- Larchar, W. L. 1975. Physiological Plant Ecology. Springer -Verlag.
- Kershaw, K. A. 1958. Quantitative and Dynamic Plant Ecology. Edward Arnold Ltd.
- Muller-Dumbois, D. and H. Ellenberg. 1974. Aims and Methods of Vegetation Ecology. John Wiley and Sons.
- Odum, E. P. 1971 - Fundamentals of Ecology. Toppan Co. Ltd., Japan.
- Shimwell, D N. 1971. Description and Classification of Vegetation. Sidwick and Jackson, London.
- Weaver, J.E. and Clements, F.E. 1978. Plant Ecology. McGraw Hill Book, N.Y.
- Waisel, J. 1972. Biology of Halophytes. Academic Press.

### **Sociology of Bangladesh**

**4 credit Hour**

#### **1. Sociology of Pre-colonial Period (pre-1757):**

- a. Aryanization, Sanskritization and Islamization
- b. Chanakya on Arthashastra
- c. Abul Fazal on Ain-E-Akbari(third part of Akbarnama)
- d. Marx on Asiatic Mode of production
- e. Weber on irrigation civilization and South Asian religion
- f. Wittfogel on Oriental Despotism

#### **2. Sociology of Colonial Period (1757-1947)**

- a. Anglicization, Christianization and Bengalicization
- b. Marx on colonialism in India
- c. Reform of land tenure, legal and administrative system
- d. English education and the emergence of middle class in India
- e. Nineteenth century Bengal renaissance
- f. Political economy of British rule and the partition of India

### 3. **Sociology of Pakistan Period (1947- 1971)**

- a. social background of Language Movement
- b. Political economy of West-Pakistan and East-Pakistan

### 4. **Sociology of Bangladesh Period (1971- till date)**

- a. Social background of Liberation War in 1971 and the emergence of Bangladesh.
- b. Genesis of capitalism and class formation in Bangladesh
- c. Globalization and the hegemony of US neoliberalism on economy, state and politics in post- liberation period of Bangladesh
- d. Sociology of everyday life; Social changes in Bangladesh: both in rural and urban society
- e. Social problems in Bangladesh: crime and violence, corruption, poverty, population, and exclusion

#### **Suggested Readings:**

- a. Anthony Giddens (2010) Sociology 6<sup>th</sup> Edition
- b. Nihar Ranjan Roy ( 1952). Bangalir Itihas: Adi Parba (Bengali)
- c. R.C. Mozumdar (1945). The History of Bengal
- d. J. N. Sarkar (1906) . A history of Bengal
- e. D. D. Kosambi (1956) An Introduction to the Study of Indian History, Popular Book Depot, Bombay
- f. Willem van Schendel (2009) . A History of Bangladesh, Cambridge University Press
- g. Archer K Blood (1974). The Cruel Birth of Bangladesh Memoirs of an American Diplomat
- h. Lawrence Lifschultz (1978). Bangladesh: The Unfinished Revolution
- i. Badruddin Umar (2004) The Emergence of Bangladesh: Class Struggles in East Pakistan (1947-1958)
- j. H Zillur Rahman and Mahbub Hossain (1999) Rethinking Rural Poverty, UPL
- k. Friedrik, Engeles (1844). The Origin of the Family, Private Property and the State
- l. Karl Marx, Capital vol 1, 1867 and vol 3, 1894; The Communist Manifesto,1848 (with Engels)  
-(1859) A Contribution to the Critique of Political Economy
- m. Sen, Amartya (1982) Poverty and Famines: An Essay on Entitlement and Deprivation
- n. Max Weber (1916) The Religion of India: The Sociology of Hinduism and Buddhism
- o. Hamza Alavi (1972). The State in Post-Colonial Societies: Pakistan and Bangladesh. New Left Review



## Social Psychology

4 credit Hour

1. Introduction: Definition and nature of Social Psychology and its methods.
2. Socialization: Processes and Agents of Socialization; Results of Socialization; Influence of Culture on Personality.
3. Individual and Group: Kinds of Group; Methods used in studying group; the nature and process of Communication; Communication by language; non-verbal communication; Definition of leadership; various approaches of studying leadership; Activities and effectiveness of a leader.
4. Attitudes: The nature of attitudes. attitudes, values and opinions; Formation of attitude; Methods of used in measuring attitudes; Attitude change.
5. Public opinion and propaganda: Definition, formation of public opinion; Role of mass media; Measurement of public opinion; techniques of propaganda; Principles of effective prpaganga.
6. Prejudice and Stereotypes: Acquire and maintainance of prejudice; Methods, Techniques of reducing prejudice; characteristics of social stereotypes.
7. Social Mobility.

### Books Recommended:

1. Klineberg O.M. Social Psychology. New York:Hold Rinehart and Winston Inc. (Latest edition).
2. Sargent, S. S. and Williamson, R.C. Social Psychology. New York: The Ronald Press Company.
3. Krech D.; Crutchfield R.S. and Ballachey, A.B. Individual in Society. New York: McGraw-Hill Book Company.
4. Newcomb, M. Social Psychology. New York: Rinehard and Winston Inc.
5. আধুনিক সমাজ মনোবিজ্ঞান, ড. হামিদা আক্তার বেগম, ফ্লোর প্রিন্ট.
6. Secor & Backman. Social Psychology.
7. Lindgreak Social Psychology.

## Economics

4 credit Hour

### Introduction:

Economics is a dynamic science-changing to reflect the shifting trends in economic affairs in the environment, in the world economy, and in society at large. Economics teaches students to use the economist's lens to view the national and international economy. Fundamentals of Economics course will cover two major branches of Economics like-Microeconomics and Macroeconomics.

Microeconomics today is concerned with the behavior of individual entities such as market firms, and households. A study of Microeconomics helps students to get a brief idea aboU important issues like demand and supply schedule, consumers' preference, theory of production, different elasticities, profit maximization of a firm and an industry, analysis of cost of a firm.

Macroeconomics is concerned with the overall performance of the economy. Today, Macroeconomics examines a wide variety of areas, such as how total investment and consumption are determined, how central banks manage money and interest rates, how government determines its fiscal policy, how national income is accounted. A study of Macroeconomics facilitates students to get a good understanding of overall economy of a country.

**Course Objective:**

This course is designed as a fundamental material to expose the core issues of Economics. The objective of this course is to give students a clear, accurate, and interesting introduction to Economics.

**Microeconomics**

1. Introductory view of economics: Definition of Economics, Twin themes of Economic, Microeconomics and Macroeconomics, Positive and Normative Economics, Basic problems of economic organization, Different economic structures to solve the problems, Production Possibility Frontier (PPF): definition and examples, economic growth by expanding PPF.
2. Demand Analysis: Demand curve and demand schedule, Movement and shift of demand, Determinants of demand, Exceptional demand curves.
3. Supply Analysis: Supply curve and supply schedule, Movement and shift of supply, Determinants of supply.
4. Market Equilibrium
5. Elasticity: Definition, Price elasticity of demand and supply, Cross elasticity, Income elasticity.
6. Some applications of price elasticity of demand: Effect of tax —impact and incidence, Paradox of bumper harvest, Price floor (minimum wage).
7. Consumer Behavior: Utility; Marginal utility; Relationship between ‘total utility’ and ‘marginal utility’; Law of diminishing marginal utility; Equilibrium condition of a consumer under utility theory; Indifference Curve: Characteristics of an indifference curve, indifference map; Budget Line, Equilibrium condition under indifference curve approach.
8. Production: The production function, factors of production, Short and long run, law of diminishing returns, returns to scale, average and marginal product, impact of technological change on production.
9. Analysis of cost and profit: Different types of costs, opportunity costs, relationship between marginal cost and average cost, accounting and economic profit.
10. Perfect competition: Assumptions of competitive market in detail without graph, profit maximizing condition of a firm.
11. Imperfect competition: Monopoly, oligopoly, monopolistic competition, monopsony (only characteristics in brief).
12. Investment decision: Present Value of an asset, Net present value, Investment decision based on net present value

**Selected Readings:**

Samuelson P.A and Nordhaus W.D., Economics  
Lipsey R., An introduction to positive economics  
Baumol W and Blinder A., Economics: Principles and Policy

**Macroeconomics**

13. Introduction to macroeconomics: GDP, GNP, National Income(NI), Different ways to measure national income, Difficulties of measurement of NI , Nominal and real NI .NI deflator.
14. Circular flow of income.
15. Aggregate demand and aggregate supply:, shift in aggregate demand and aggregate supply. macroeconomic equilibrium.
16. Inflation. Demand pull inflation and cost push inflation in detail with graphical explanation
17. Money and banking: Definition and functions of money, Interest rate determination: emand an supply of money, money market equilibrium.

18. Monetary and fiscal policy: Definition of monetary and fiscal policy, Their objectives, Monetary and fiscal policy during inflation, Government revenue and expenditures, Classification of tax, Tax system of Bangladesh, Public debt and its burden.

19. International Trade: Absolute and comparative advantage theory, gains from trade, Advantages and disadvantages of free trade. protectionism. Effect of tariff, Advantages and disadvantages of protectionism.

20. National Budget Analysis (Fiscal Year 2010-2011).

**Selected Readings:**

Parkin M., Macroeconomics

Hyman D.. Economics

**International Relations**

**4 credit Hour**

Course Outlines

• Introduction to International Relations as an academic discipline:

Definition, importance, scope and nature

• Basic concepts in the study of IR: The actors, national power, national interests, levels of analysis, idealism, liberalism and realism

• Global order and its major features

• Bangladesh in global affairs: The emergence of Bangladesh as an independent nation, the role of external powers

• Understanding foreign policy, objectives and principles of Bangladesh foreign policy

• Determinants and policy making process of Bangladesh foreign policy

• Geopolitics of Bangladesh

• National Security of Bangladesh: traditional and non-traditional issues

• Bilateral focus of Bangladesh's Foreign Policy: Bangladesh-India, Bangladesh-Pakistan, Bangladesh-China, Bangladesh-USA, Bangladesh Japan

• Regional focus of BFP: SAARC, OIC, and the Muslim world

• Global focus of BFP: The UN, WTO and the World Bank-IMF

• Future directions of BFP

**Selected Readings:**

(International Relations and Bangladesh Foreign Policy)

Joshua S Goldstein, International Relations, Longman, 2005

John Baylis and Steve Smith, eds. The Globalization of World Politics: An Introduction to International Relations.

Karen Mingst, Essentials of International Relations

Palmer and Perkins, International Relations

Charles W. Kegley, Jr. and Eugene R. Wittkopf. World Politics: Trends and Transformation.

Michael G. Roskin and Nickolas O. Berry, The New World of IR, Prentice Hall, 2005

Trevor C. Salmon and Trevor C. Salmon, eds. Issues in International Relations, Routledge, 2000

Gregory C. Kennedy, *Incidents and International Relations: People, Power, And Personalities* (Praeger Studies in Diplomacy and Strategic Thought), 2002

Harun ur Rashid, *International Relations and Bangladesh*, UPL, Dhaka, 2004

Abul Kalam, *Bangladesh: External Linkages and Internal Dynamics*

Faruk Sobhan, *Indo-Bangladesh Relations*

Emajuddin Ahmed (ed) *Foreign Policy of Bangladesh: A Small State Imperatives*

Muzaffar Ahmed and Abul Kalam (eds.) *Bangladesh Foreign Policy: Changes and Directions.*

M.G. Kabir and Shaukat Hassan (eds) *Issues and Challenges Facing Bangladesh Foreign Policy.*

Nurul Momen. *Bangladesh in the United Nations: A Study of Diplomacy.*

SR. Chakravarti and V. Narain (eds.) *Bangladesh Volume 3 Global Politics.*

Emajuddin Ahmed and Abul Kalam (eds.) *Bangladesh, South Asia and the World.*

Emajuddin Ahmed, *SAARC: Seeds of Harmony.*

Iftexharuzzaman and Jmtiaz Ahmed (eds.) *Bangladesh and SAARC: Issues, Perspectives and Outlooks.*

M. Shamsul Huq. *Bangladesh in International Politics: Dilemmas of a Weak State.*

### 3rd Year B.Sc. (Honours) Course (Session : 2018-2019 and 2019-2020)

Course Code	Course Title	Credit Hours
GETh 301	Geographic Thoughts and Concept	3
GETh 302	Geomorphology-1	3
GETh 303	Climatology-I	3
GETh 304	Rural Geography	3
GETh 305	Geography of Natural Resources	3
GETh 306	Bangladesh : Physical Geography and Environment	3
GETh 307	Bangladesh : Human Geography and Environment	3
GETh 308	Quantitative Techniques in Geography and Environment-II	3
GETh 309	Economic Geography-II	2
GELb 310	GIS-II: Advanced Data Concepts in GIS	2
GELb 311	Remote Sensing-II: Image Processing and Analysis	2
GELb 312	Map Reading and Interpretation	2
GELb 313	Research Methods and Field Survey in Physical Geography and Environment-II	3
GEV 314	Viva	2
	Total credit hours	37

#### **GETh 301 : Geographic Thoughts and Concept**

**3 Credit Hour**

1. Introduction to Geography: The Construction of a Discipline
  - An academic discipline
  - The conceptual structure of the discipline
  - Organizational Structure of the discipline
  
2. Foundation of Scientific Geography
  - The Emergence of Modern Geography after the Great Age of Explorations and Renaissance (Varenus, Kant) Alexander Von Humboldt, Karl Ritter and Darwin.
  - The German School of Geography
  - The French School of Geography
  - Anglo-American Geography(Britain and USA)
  - The Soviet and Russian Geography
  
3. Dichotomies in Geography-
  - Physical vs. human
  - Regional vs. systematic
  - Idiographic vs. Nomothetic
  - Theoretical vs. Applied
  
4. Trends of Contemporary Geography after World War II
  - Paradigms and Revolutions and Shift of Paradigm
  - New trend and approaches
    - Quantitative Revolutions
    - Behaviour Approach
    - Positivist Views
    - Humanistic Views
    - Reality and Realism
  - Critical Science and Critical Geography.
  - Post Modern Geography
  - Gender Geography
  
5. Explanations in Geography

Methodological Issues and Problems in Geography  
 Routes to Scientific Explanation  
 A Priory and a Posteriori Analysis  
 Major Analytical Techniques  
     Regional vs. Systematic Analysis  
     Cognitive Description  
     Morphometric Analysis  
     Causes and Effect Analysis  
     Temporal Mode of Analysis  
     Ecological and Functional Analysis  
     Systems Analysis

6. Role of Theory: Hypothesis, Models and Law
7. Development of Geography in South Asia with Special Reference to Bangladesh
8. Status of Geography in Bangladesh
9. Application of Geographical Knowledge
- 10 Teaching, Higher Education and Research
11. Further Scope of development

**Selected Readings:**

- Abler, Adams, J. and Gould, P. *Spatial Organization : The Geographer's Views of the World*  
 Ackermann, Edward A. "Where is the Research Frontiers?" *Annals of the AAG, Vol 53*  
 Ahmed, Nafis *Muslim Contributions to Geography*  
 Ambrose, Peter *Analytical Human Geography (Chapter-1)*  
 Berry, B.L.J. and Marble, D.F. (ed.) *Spatial Analysis*  
 Broek, Jan O.M. *Geography: Its Scope and Spirit*  
 Brumhes, J. *Human Geography*  
 Buuguet, William *Theoretical Geography*  
 Chorley, R. and Peter Haggett (ed.) : *Models in Geography*  
 Chorley, R.L. and Haggett, Peter *Frontiers in Geographical Teaching.*  
 Cohen S.B.: *Problems and Trends in American Geography.*  
 Cooke, R.U. and J.H. *Trends in Geography : An Introduction Survey*  
 Diskinson, Robert E. *The Makers of Modern Geography*  
 Dohrs, F.H. Sommers, I.M and Patterson, D.R. *Outside Readings in Geography.*  
 Dohrs, Fred F. and Sommers, L.M. *Introduction to Geography*  
*Encyclopaedia Britannica*  
*Encyclopaedia of Social Sciences*  
 Fuson, R.H. *A Geography of Geography*  
 Haggett, P. *Geography: A Synthesis*  
 Hartshorne, R. *The Nature of Geography*  
 Harvey, David : *Explanation in Geography*  
 Huggett, P. : *Locational Analysis in Human Geography*  
 James, Preston E. (ed.) *Inventory and prospect*  
 James, Preston E.: *All Possible Words: History of Geographical Ideas*  
 Johnston, R.J. *Geography and Geographers*  
 Krik, William : *Problems in Geography' Geography*  
 Merrill, R *The Spatial organization of Society*  
 Miah, M. Maniruzzaman *Tasks and Challenge Before Geography in the 1980' Souvenir, Bangladesh Geographical Society*  
 Minshull, Roger M.: *The Changing Nature of Geography*  
 Minshulla R.M. *Regional Geography : Theory and Practice*  
 Murphy, Rhoads *An Introduction to Geography.*  
 Murphy, Rhoads *The Scope of Geography.*

National Academy of Sciences U.S.A. *The Science of Geography*  
 Nazrul Islam *A Case for Geography Upakul No. 3*  
 Sykes, Percy *A History of Exploration*  
 Taaffe, E. *The Spatial View in Context' Annals, Vol. 54.*  
 Taaffe, Edward Ed. : *Geography*  
 Taylor, Griffith *Geography in the Twentieth Century*  
 Tozar, F. *A History of Ancient Geography*  
 A. Holt-Jensen: *Geography: History and Concepts – A student's Guide*  
 Dikhit: *Geographical Thoughts*  
 Majid Hossain: *Geographical Thoughts and Concepts*  
 ইসলাম, এম. আমিনুল, ভূগোল, দৃষ্টিভঙ্গি ও দর্শন, ভূগোল বিভাগ, ঢাকা বিশ্ববিদ্যালয়  
 আহমাদ, নারফিস (অনুবাদ নজরুল ইসলাম ও জামাল খান), ভূগোল বিজ্ঞানে মুসলমানদের অবদান, ঢাকা : বাংলা একাডেমী  
 দত্ত, কুম্ভলা লাহাড়ী, ভূগোল চিন্তার বিকাশ, কলিকাতা : ওয়ার্ল্ড প্রেস

### **GETh 302 : Geomorphology - I**

**3 Credit Hours**

- 1 Introduction to Geomorphology: Definition, Scope and Subject Matter; Objectives and Methods of Explanations; Form, Process and Pattern; Application of Geomorphological Knowledge to Environmental Problems
- 2 Development of Geomorphological Thoughts; Pre-Davisian Geomorphology-James Hutton; Davisian Cycle of Erosion; Penck and King's Concepts
- 3 Modern Geomorphology;
  - 3.1 Morphogenetic Regions and Climatic Geomorphology
  - 3.2 Environmental Dynamism and Geomorphology
  - 3.3 General System Theory and Geomorphology
4. Geochronology; Geological Time-Scale; Development of Land Surface
- 5 Theories on the Various Tectonic Aspects of the Earth's Surface Processes
  - 5.1 Wegner's Continental Drift Theory and Plate Tectonic Theory
  - 5.2. Theories of Earthquake, Volcanism
  - 5.3. Theories of Isostasy and Gravity Tectonics
  - 5.4 Kober's Geosynclinal Orogenic Theory and Mountain Building

#### **Selected Readings**

Thornbury, W. D., Principles of Geomorphology  
 Sharma, V. K., Geomorphology: Earth Surface, Process and Forms  
 Small, R. J., The Study of Landforms  
 Sparks, B. W., Geomorphology  
 Chorley et. al., Geomorphology  
 Emblemton, C & Thomas J., Process in Geomorphology

### **GETh 303 : Climatology - I**

**3 Credit Hour**

1. Introduction to Climatology: Scope and Methodology
2. The Atmosphere: Structure and Present Composition; Characteristics of the Gases – Carbon dioxide, Ozone; Global Temperature Change and Greenhouse Effect
3. The Energy of the Atmosphere
  - 3.1 Isolation & Temperature: Factors & Controls; Transfer of Energy; The Earth's Heat Balance ; Spatial & Temporal Variation of Temperature; Inversion of Temperature
  - 3.2 Air Pressure; Causes; Horizontal & Vertical Variation of Pressure
4. Atmospheric Moisture;

- 4.1 Humidity- Moisture Variables; The Hydrologic Cycle
  - 4.2 Evaporation and Condensation
  - 4.3 Condensation Forms: Clouds, Fogs
  - 4.4 Precipitation: Formation and Types
- 5. Atmospheric Motions
    - 5.1 Forces Controlling Motion: The Coriolis Force
    - 5.2 Winds in the Upper Atmosphere: Geostrophic, Gradient, Friction Layer and Vertical Wind
    - 5.3 Temperature and Air Motions; Adiabatic Processes; Air Stability; Relationship between Vertical and Horizontal Motion
- 6. Atmospheric Circulation and Scales of Motion
    - 6.1. Planetary Scale; Tricellular Model and General/Planetary Circulation; Jet streams
    - 6.2. Macro Scale; ITCZ and the Monsoon Wind System; Cyclones (Tropical); Anticyclone
    - 6.3. Meso Scale; Land & Sea Breeze, Mountain & Valley Winds,
    - 6.4. Micro Scale Circulation
- 7. Ocean Atmosphere Relationship: Walker Circulation, El-Nino, La-Nina,

### **Selected Readings**

Barry, R.G., and R.J. Chorley, Atmosphere, Weather and Climate, Methuen & Co.  
 Critchfield, H.J., General Climatology. 3rd ed. Englewood Cliffs, N.J. Prentice Hall.  
 Hare, F. K., The Restless Atmosphere.(Revised edition). New York : Harper & Row Publishers Inc.  
 Mather, J. R., Climatology. Fundamentals and Applications. New York : McGraw Hill Book  
 Trewartha, G.T. and Horn, L.H., An Introduction to Weather and Climate. 5th ed. McGraw-Hill.  
 Pettersen, S., Introduction to Meteorology, New York : McGraw-Hill Book Co., Inc.  
 Aguado, E. and Burt, J. E. 2010. Understanding Weather and Climate. Fifth Edition, Prentice Hall, New Jersey, USA.

### **GETh 304 : Rural Settlements**

**3 Credit Hours**

1. Definitions and meanings of “rural”, Rural geography as sub-discipline
2. Theoretical approaches to rural restructuring
3. Rural Livelihoods, poverty and change
4. Changing rural economy and society: Rural migration & demographic change, depopulation, rural-urban drift, rural industries, rural development models
5. Changes in the extensive use of rural land- The case of Bangladesh (agricultural, forest, wetlands etc)
6. Economic change in rural worlds: Rural periodic markets and centres, Characteristics and Types, Periodicity and Synchronization
7. Political change in rural worlds: GOs & NGOs
8. Rural settlements: Definition, Scope and Approaches of Rural Settlement Geography: Phases and Development of Permanent Settlement, Factors of Dispersion and Agglomeration
9. Rural House Types: Influencing Factors, Classification of House Types
10. Overview and Evaluation of the Theories and Models

### **Selected Readings**

1. Ilbery, Brian, (ed), The geography of Rural Change, Pearson/Prentice Hall, UK, 1998.
2. Daniels, Peter, et al (eds), An Introduction to Human Geography: Issues for 21<sup>st</sup> century, 3<sup>rd</sup> Edition, Pearson/Prentice Hall, UK, 2008.(Section 3.11 }
3. Bernstein, Henry, et al (eds), Rural Livelihoods: Crises, Oxford University Press, 1992.
4. Chambers R. Rural Development: Putting the last first, Pearson/Prentice Hall, 1983
5. Robinson, Guy. Geographies of Agriculture: Globalisation, Restructuring and Sustainability, Pearson/Prentice Hall, 2003
6. Jo Little, Gender and Rural Geography, Pearson/Prentice Hall, 2001



7. Broek, J.O. & Webb, J.W., Geography of Mankind
8. Carter, H., Urban and Rural Settlement
9. Daniel, P., The Geography of Settlement
10. Gordon, G. and Dick, W., Settlement Geography
11. Hudson, F.S., A Geography of Settlement
12. Mayer, L. & Haggett, R.J., Settlement
13. Mandal, R.B., Introduction to Rural Settlement
14. Perpillon, A.V., Human Geography
15. Rapoport, Amos, House Form and Culture
16. Singh, R.L. (et.al.), Geographic Dimensions of Rural Settlements
17. Sultana, S., Settlement Pattern of Bangladesh
১৮. বাকী আবদুল, গ্রামীণ বসতি, ঢাকা : বঙ্গ প্রকাশনী
19. চৌধুরী, সিরাজুল ইসলাম, আর্থনীতিক ভূগোল, ঢাকা বিশ্ববিদ্যালয়

### **GETh 305: Geography of Natural Resources**

**3 Credit Hour**

*Natural Resources:* Definitions, concepts, types, scope, spatial characteristics and temporal cycles

*Forest Resources:* Extent of resource base, changing nature, regimes, use and environmental implications

*Water Resources:* Extent of resource base, supply and demand, quality, management

*Land Resources:* Biodiversity, protected areas and environmental conservation

*Mineral Resources:* Extent of resource base, scarcity and abundance, exploitation, international relations, conflict and impact of mining

*Energy Resources:* Sources, consumption, reserves and scarcity, environmental externalities

*Contemporary Issues of Natural Resource Conservation:* Economic development, population growth, technology and carrying capacity, climate change

*Environmental Treaties and Strategies:* Environmental movement and natural resources, progress of sustainability, equity and ethics, resource conservation strategies from Stockholm to Rio

#### **Selected Readings**

Mather, A. S. and Chapman, K. (1999) Environmental Resources, Longman

Chiras, D. D and Reganold, J.P. (2009) Natural Resource Conservation; Management for a Sustainable Future, Pearson Education Ltd.

### **GTh 306: Bangladesh : Physical Geography & Environment**

**3 Credit Hour**

1. Introduction: Locational Characteristics and Its Importance; Evolution of Boundary
2. The Natural Environmental Setting
  - 2.1 Geological and Tectonic Aspects
  - 2.2 Relief and Physiography
  - 2.3 River systems and wet lands, Flood and Floodplain
  - 2.4 Climate and climatic hazard
  - 2.5 Soils; Agro ecological Zone
3. Major Resource Bases; Natural Resource: Land, Water, Minerals, Fuel and Energy, Agriculture, Fisheries, Livestock, Forests
4. Major Issues of Environment
  - 4.1. Environmental pollution (Soil, Water & Air)

- 4.2 Effect of Climate Change
  - 4.4. Impact of Major Engineering Projects
  - 4.5. Major Regions of Environmental Concern
  - 4.6. Hydrometrological Hazards; Riverbank Erosion, Flood; and Tectonic Hazard
5. Environmental Policies of Bangladesh; Environmental Instruments and Institutions & Movements; Environmental Policies; Environmental Ethics and Awareness

### **Selected Readings**

- Ahmad, Nafis, *A New Economic Geography of Bangladesh*, New Delhi : Vikas
- Ahmad, Nafis, *An Economic Geography of East Pakistan*, London: Oxford University Press
- Ahmad, Q. K., Ahmad, N, and Rasheed, K.B.S. (eds) (1994), *Resources, Environment and Development in Bangladesh*. Dhaka : Academic Publishers.
- Bangladesh Centre for Advanced Studies (1994), *Wetlands of Bangladesh*, Dhaka :
- Bangladesh National Conservation Strategy, Ford Foundation, Dhaka
- Centre for International Development and Environment (1990), *Bangladesh : Environmental and Natural Resource Assessments*, Prepared for USAID. Washington D.C.
- Elahi, K, Moudood (ed), *Perspectives on Bangladesh Geography*, Dhaka: Bangladesh National Geographical Association
- Haroun er Rashid *Geography of Bangladesh*, Dhaka: University Press Ltd.
- Islam, Nazrul and Ahsan, Rosie Majid eds., *Urban Bangladesh : Geographical Studies*, USP, Department of Geography, Dhaka University.
- Kabir, M. H. and Asiv, S.N.N (2007) *Tanguar Haor: A Diversified Fresh Water Wetland*, Appl, Dhaka
- Kabir, M. H. and Endlicher, W. (2012). *Exploitation of Renewable Energy in Bangladesh: Power Supply and Climate Protection Perspectives*, AHDPH, Dhaka.
- Nishat, A, *Water Resources, Flood Control, National Conservation Strategy Report*, IUCN
- Rahman, A. Atiq et al., *Environment and Development in Bangladesh*, Vol. 1-2, Dhaka :.
- Wadia, D.N., *Geology of India*, London
- রশীদ, কে. বি. এস. (১৯৭২), *বাংলাদেশ : ভৌগোলিক পরিচয়*, ঢাকা : নগর গবেষণা কেন্দ্র
- চৌধুরী, সিরাজুল ইসলাম (১৯৮৬) *আর্থনীতিক : ভৌগোলিক পরিচয়*, ঢাকা : নগর গবেষণা কেন্দ্র

### **GTh 307 : Bangladesh : Human Geography and Environment**

**3 Credit Hour**

1. **Introduction:** Scope and aspects of human geography; Geopolitical emergence of Bangladesh (legacy of British and Pakistani rules, economic disparity, liberation war, geographical and Cultural differences.), Importance of this course.
2. **Geographic Study of Population and Settlement:** Population distribution and dynamics (fertility, mortality, migration); Population density and growth; Urban and rural settlements of Bangladesh (settlement types, forms, hierarchies, and rural market centers).
3. **Geographic Study of Major Economic Activities:** Primary activities (agriculture, fisheries, forestry, livestock and mining); Secondary activities (large, medium, small and cottage industries); Tertiary activities (trade, business and services like transport & communication, health, education etc.).
4. **Major Challenges and Issues of Sustainable Development:** (1) Acute population pressure and its impacts, (2) Skewed distribution of resources and income, (3) Gender disparity and inequality, (4) Poverty alleviation and addressing malnutrition, (5) Linking development with urbanization and rural-urban linkage, (6) Regional inequality and development, (7) Increasing land carrying capacity through proper utilization of land and water resources, (8) Addressing donors' driven development, (9) Human resource development inline with changing needs at home and in abroad, (10) Developing disaster and environment friendly physical infrastructure, and (11) Protecting life, property and biodiversity from natural and man-made hazards, and (12) Strengthening regional and global collaborations, interactions and networking through dynamic leadership.

5. **Opportunities and Challenges of Globalization:** Geographic and demographic options and challenges; Strengthening human resource development and exporting man-power; Expanding commodity (both goods and services) exports.

### Selected Readings

- ADB (1990) *Bangladesh Environmental & National Resources Management: A Sectoral Review*, Manila.
- Ahmad, Q.K., Ahmad, N, and Rasheed, K.B.S. (eds) (1994) *Resources, Environment and Development in Bangladesh*. Dhaka: Academic Publishers.
- Asiatic Society of Bangladesh, *Banglapedia*, Dhaka
- Bangladesh Bureau of Statistics, *Bangladesh Population Census Reports*.
- Bangladesh Bureau of Statistics, *Bangladesh Census of Agriculture and Livestock*.
- Bangladesh Bureau of Statistics, *Statistical Yearbook of Bangladesh*, Published annually by (BBS).
- Bangladesh Centre for Advanced Studies (1994), *Wetlands of Bangladesh*, Dhaka.
- Brammer, Hugh (2012), *The Physical Geography of Bangladesh*, UPL, Dhaka
- Brammer, Hugh, Land use and Land Use Planning in Bangladesh, UPL, Dhaka
- Brammer, Hugh, Agricultural Development Possibilities in Bangladesh, UPL, Dhaka
- GOB, *Five Year Plans*, by Planning Commission.
- Haroun-er-Rashid: 1995: *Geography of Bangladesh*, UOL, Dhaka.
- Islam M.A. 1995: *Environment; Land use and Natural Hazards in Bangladesh*, University of Dhaka.
- Islam, Nazrul *Dhaka from City to Mega City: Perspectives on People, Places, Planning and Development Issues*, USP, Department of Geography, DU.
- Islam, Nazrul and Ahsan, Rosie Majid eds. *Urban Bangladesh : Geographical Studies*, USP, Department of Geography, Dhaka University.
- Nishat, A. *Water Resources, Flood Control, National Conservation Strategy Report*, IUCN/GOB, Dhaka.
- Rahman A. Atiq et al. *Environment and Development in Bangladesh Vol.1-2*, UPL Dhaka.
- Rasheed, KB Sajjadur (2008), *Bangladesh: Resource and Environmental Profile*, AH Development Publishing House, Dhaka.
- Rasheed, KB Sajjadur (2008), *Water Resources Management with Examples from Bangladesh*, AH Development Publishing House, Dhaka.
- University Press Limited, *Report of the Task Forces on Bangladesh Development Strategies for the 1990's Vol. 1-4*, UPL, Dhaka.

### GETH 308 : Quantitative Techniques in Geography and Environment-II 3 Credit Hour

1. Elementary Probability Theory
  - 1.1 Law of Addition and Law of Multiplication
  - 1.2 Probability Distributions
    - 1.2.1 Binomial
    - 1.2.2 Normal
    - 1.2.3 Poisson
  - 1.3 Normal Distribution and Properties of Normal Curve
  
3. Hypothesis Testing
  - 3.1 Null Hypothesis
  - 3.2 Levels of Significance
  - 3.3 Student's t-test
  - 3.4 Chi-square test
  - 3.5 Analysis of Variance
  
4. Correlation and Regression
  - 4.1 Pearson's Product Moment Correlation
  - 4.2 Spearman's Rank Correlation
  - 4.3 Regression by the Least - Squares Method
    - (a) Constructing Regression Lines
    - (b) Confidence Limits to Least Squares Regression Lines
    - (c) T-test for Correlation and Regression Coefficients
    - (d) Multiple Regression and Residuals Analysis

5. Classification Model/Factor Analysis /Principal Component Analysis
6. Spatial Measures
  - (a) Point Pattern Analysis
  - (b) Mean and Median Centres
  - (c) Quadrat Analysis
  - (d) Nearest Neighbour Analysis
  - (e) Line-Network Analysis
  - (f) Transport networks
  - (g) Connectivity
  - (h) Run-test

### **Selected Readings**

Yeates, M, An Introduction to quantitative Analysis in Human Geography, McGraw Hill Inc.  
 Johnston, R.J., Multivariate Statistical Analysis in Geography, Longman, USA  
 Cole, J.P. & King C.A. M., Quantitative Geography - Techniques and Theories in Geography, John Wiley & Sons Ltd, USA.  
 Taylor, P. J., Quantitative Methods in Geography. Houghton Mifflin Company, London.  
 Mahmood, A., Statistical Methods in Geographical Studies, Rajesh Publications, India.  
 Unwin, D., Introductory Spatial Analysis, Methuen, New York, USA.

### **GTh 309: Economy Geography-II**

**2 Credit Hour**

Economic System and The Changing Global Map of Economic *Activity*.

Locational Analysis I: Why Land is a Unique Commodity, Bid Rent Curves, Patterns of Land Use, The Real World and Modifications.

Locational Analysis II: Losch's Model of Location, Smith's Spatial Margins of Profitability Model

Locational Analysis III: The Hotelling Model, Losch's Modifications of Central Place Theory.

Locational Analysis IV: The Case of Corporate Headquarters.

Transportation and Spatial Interaction: Ullman's Principles of Spatial Interaction, and Alternative Principles for Information Flows, Transportation Route/ Network Location and Growth, Transportation Pricing Systems, Transportation Costs, and Their Effect on the Location of Economic Activity.

Economies: Why Activities Cluster in Cities, The Spatial-economic Structure of Cities.

Regional Economy: Classification, Growth and Development

### **Selected Readings**

Goudie, A. (1993): *The Nature of the Environment*, Blackwell Publishers, UK.  
 Haggett, P. (1975): *Geography: A Modern Synthesis*, Harper & Row, New York.  
 Hanink, Dean. (1997). *Principles and Applications of Economic Geography: Economy, Policy, Environment*.  
 Toronto: John Wiley and Sons, Inc.  
 Hartshorn, T. A. and Alexander, J.W (1994): *Economic Geography*, Prentice - Hall, New Delhi.  
 Jhingan, M. L. (1994): *The Economics of Development & Planning*, Konark Publishers, Delhi.

- Barnes, T. J. (1996). *Logics of dislocation: models, metaphors and meanings of economic space*. New York: Guilford.
- Cook, P. (2004). Follow the thing: Papaya. *Antipode* 36, 642-64.
- Dicken, P. (2007). *Global shift: Mapping the changing contours of the world economy*. New York: Guilford.
- Gibson-Graham, J.-K. (1996). *The end of capitalism (as we knew it): A feminist critique of political economy*. Oxford: Blackwell.
- Harvey, D. (1982). *The limits to capital*. Chicago: University of Chicago Press.
- Leyshon, A. and Thrift, N. 1997. *Money.space: Geographies of monetary transformation*. London: Routledge.
- Masse, D. (1984). *Spatial divisions of labour: Social structures and the geography of production*. London: MacMillan.
- McDowell, L. (1997). *Capital culture: Gender at work in the city*. Oxford: Blackwell.
- Peck, J. 1996. *Work place: Social regulation of labor markets*. New York: Guilford.
- Saxenian, A. (1994). *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
- Schoenberger, E. (1997). *The cultural crisis of the firm*. Oxford: Blackwell.
- Scott, A. J. (1988). Flexible production systems and regional development: the rise of new industrial spaces in North America and Western Europe. *International Journal of Urban and Regional Research* 12,171-85.

## **GELb 310 : GIS-II- Advanced Data Concepts in GIS**

**2 Credit Hours**

### **Theory Lectures**

#### **1. Acquisition and preprocessing of Geo-referenced Data**

Coordinate Systems; Transformations and map Projections; Digitizing, Editing and Structuring Map data; Primary Data Acquisition from Ground and Remote Surveys.

#### **2. Database Structures: data organization in the computer**

File and data access; Database approach; Classic data models; Database Management Systems.

#### **3. Data Quality, Accuracy and Errors in Spatial Data**

Components of data Quality; Positional Accuracy; Attribute Accuracy; Logical Consistency; Spatial Resolution; Data Transfer Standards.

**Lab Sessions** (Using the Tutorial Book by Wilpin L. Gorr and Kristen S. Kurland available at the GIS Lab)

4. **Building a Personal Geodatabase:** Build, Modify, Join Tables, Aggregate, Export other ArcCatalog utilities
5. **Importing Spatial and Attribute Data:** Sources of Maps and Data, Vector Spatial Data Format, Identify and Change Projections, Examine Metadata, View Attribute Data.
6. **Digitizing:** Digitize and Edit Polygon layer, Digitize a Point Layer, Digitize a Line layer, Spatially adjust features.
7. **Spatial Data Processing:** Use data queries to extract features, Clip Features, Dissolve features, Append layers, Union Layers, Run Multiple operations with Model Builder.

## **Selected Readings:**

**C.P. Lo & Albert K. W. Yeung** (2002), *Concepts and techniques of Geographic Information Systems*, Prentice-Hall, New Delhi, India.

**Ian Heywood, Sarah Cornelius and Steve Carver** (1999), *An Introduction to Geographical Information Systems*; Longman, UK.

**Peter A. Burrough and Rachael A. McDonnell** (1998), *Principles of Geographical Information Systems*, Oxford University Press, UK.

**Stan Aronoff** (1995), *Geographic Information Systems: A Management Approach*, WDL Publications, Ottawa, Canada.

**Christopher B. Jones** (1999), *Geographical Information Systems and Computer Cartography*, Longmans, UK.

**Michael N. Demers** (2003), *Fundamentals of Geographic Information Systems*, John Wiley & Sons Ltd. USA.

## **GELb 311 : Remote Sensing-II- Image Processing and Analysis**

**2 Credit Hour**

### ***Introduction to Digital Image and Image Processing System***

- 1.1 Introduction to digital image processing- Concept of digital image, steps in DIP
- 1.2 Image processing systems –hardware and software considerations
- 1.3 Digitization of photographic image , converting digital image to visual form image
- 1.4 Digital image data formats, Image data storage and retrieval

#### **Labs:**

1. *Introduction with DIP Software*
2. *Image Data Format and Exchange/Import*

### ***Image Restoration and Rectification***

- 2.1 Radiometric correction of remotely sensed data
- 2.2 Geometric correction of remotely sensed data
- 2.3 Image registration – definition principle and procedure
- 2.4 Basic statistical concepts in DIP and use of probability methods in DIP

#### **Labs:**

3. *Image Registration*
4. *Radiometric and Geometric Correction of Image*
5. *Basic Statistics of Image*

### ***Image Enhancement and Analysis***

- 3.1 Image enhancement Techniques - an overview
- 3.2 Contrast Enhancement - Linear and non linear, Histogram equalization and Density slicing
- 3.3 Spatial filtering and Edge enhancement
- 3.4 Multi image manipulation – addition, subtraction and Band rationing

#### **Labs:**

6. *Image Enhancement ( various types of)*
7. *Spatial Filtering ( different types of )*
8. *Band ratio and analysis and comparison*

### ***Principal Component Analysis and Image Transformation***

- 4.1 Principal Component Analysis
- 4.2 Enhancement by using colors – advantages, Types of color enhancements
- 4.3 BGR – coding and generation of FCC's
- 4.4 Image transformation – Intensity Hue Saturation (HIS)

#### **Labs:**

9. *PCA Analysis*
10. *BGR and FCC image generation and analysis*
11. *Image transformation*

### ***Pattern Recognition and Image Classification***

- 5.1 Pattern recognition and image classification, Unsupervised classification – advantage, disadvantage and limitations
- 5.2 Supervised classification - training site selection , Classifiers used in supervised classification – Minimum distance to mean, Parallelepiped, maximum likelihood
- 5.3 Classification accuracy assessment
- 5.4 Hyper-spectral image analysis

#### **Labs:**

12. *Image Classification (Supervised and Unsupervised)*
13. *Classification Accuracy Assessment*
14. *Exercise on Image Classification (based on research articles)*

#### **Selected Readings:**

- Drury, S.A., 1987: Image Interpretation in Geology. Allen and Unwin  
Gibson, P.J. 2000: Digital Image Processing. Rutledge Publication  
Gupta, R.P., 1990: Remote Sensing Geology. Springer Verlag.  
Joseph George, 2003: Fundamentals of remote sensing. Universities Press  
Lillesand, T.M., and Kieffer, R.M., 1987: Remote Sensing and Image Interpretation, John Wiley.  
Nag P. and Kudrat M. 1998: Digital Remote Sensing. Concept Publication  
Pratt.W.K. 2004: Digital Image processing. John Wiley  
Sabbins, F.F., 1985: Remote sensing Principles and interpretation. W.H.Freeman and company

### **GELb 312 : Map Reading and Interpretation**

**2 Credit Hour**

- 1 Basics of Map Reading; Methods of Showing Relief;- Pictorial, Mathematical, Combination of the two (Pictorial Land Mathematical)
2. Gradient Analysis;
  - 2.1 Slope Determination
  - 2.2 Understanding Contour. Profile drawing from imaginary contour.
  - 2.3 Techniques of Identifying Intervisibility; Cross Section; Gradients ; Similar Triangle
- 3 Interpretation of Topographical Maps
  - 3.1 The Language of Maps; Marginal Information of Topographical and other Maps; Conventional Signs and Symbols; Concept of Sheet Number
  - 3.2 Interpretating the Physical Features; Understanding the Relief and Slopes. Identifying for Physiographic Regions
  - 3.3 Interpretating the Human/Cultural Features
  - 3.4 General Understanding of the Landuses; Communication Network; Analysis of the Relationship between Physical and Cultural Features, Look for Spatial Patterns; Distribution, Density and Regions
4. Interpretation of Geological Map
  - 4.1. Definition, Types and Use of Geological Map
  - 4.2. Study of Outcrop, Bedding, Unconformity, Folding, Faulting, Strike and Lineament
- 5 Understanding the Weather Maps; Differences of Weather and Climatic Maps; Signs and Symbols of Weather Maps

#### **Selected Readings:**

- Bygott, John, An Introduction to Mapwork and Practical Geography  
Singh, R.L., Elements of Practical Geography  
Ajaegbu, H.I. and Faniran, A., A New Approach to Practical Work in Geography

**GELb 313: Research Methods and Field Survey in  
Physical Geography and Environment-II**

**3 Credit Hour**

1. Research in Physical Geography:
  - 1.1. Types, Characteristics, Methodology,
  - 1.2. Selection of Research Topic, Research Design
2. Fieldwork in Physical Geography Research:
  - 2.1 Needs of Fieldwork in Physical Geography
  - 2.2. Site Selection
  - 2.3. Fieldwork Preparation, Supports,
3. Fieldwork on Geomorphological Mapping:
  - 3.1 Topographical Survey
  - 3.2 Identification of Geomorphological Units
  - 3.3. Preparation of geomorphological maps
4. Hydrological Survey
  - 4.1 Measurements of River flow
  - 4.2 River-cross section analysis,
  - 4.3. River bed sediment collection and field description
5. Profile/Out-crop Study
  - 5.1 Preparation of section/out-crop cleaning, identification of layers/beds
  - 5.2. Description of sediment in the field after Troels-Smith Scheme
  - 5.3. Application of Monolith, Graphical and Match stick techniques in the field.
  - 5.4. Use of Munsell Colour Chart in the field
6. Borehole sediment Collection
  - 6.1 Site selection for borehole
  - 6.2. Description of borehole sediment in the field after Troels-Smith Scheme
7. Slope Analysis
  - 7.1 Measurement of Hill slope by Trigonometric method
  - 7.2. Direct measurement of slope using slope meter
8. Vegetation Survey:
  - 8.1. Vegetation survey by quadrant method
  - 8.2. Species identification with reference to different land levels
  - 8.3. Study the relationship of vegetation species with soil type
9. Report writing using data collected from the field.

**Selected Readings:**

Gouide A (1990) Techniques in Physical Geography, Routledge, London

**GEV 314: Viva**

**2 Credit Hours**



## 4th Year B.Sc (Honours) Course (Session : 2018-2019 and 2019-2020)

Course Code	Course Title	Credit Hours
GETh 401	Geomorphology-II	3
GETh 402	Climatology-II	3
GETh 403	Political Geography	3
GETh 404	Urban Geography	3
GETh 405	Agricultural Geography	3
GETh 406	Environmental Management	3
GETh 407	Regional Geography and Environment of South East Asia	3
GETh 408	Transport Geography	3
GETh 409	Landuse Planning and Development	3
GELb 410	GIS –III: Spatial Analysis and Modeling	2
GELb 411	Remote Sensing –III: Thermal and Microwave Remote Sensing	2
GELb 412	Techniques in Physical Geography	2
GELb 413	Environmental Analysis	2
GELb 414	Landuse Survey	3
GEV 415	Viva	2
<b>Total Credit Hours</b>		<b>40</b>

### GETh 401 : Geomorphology-II

**3 Credit Hour**

1. Geomorphological Processes: Erosional process; Transportational Process; Deposition/ Sedimentation/Siltation process
2. Development of Slope; Mass Movements , Landslides; Transportation of Eroded Materials
2. The Humid Geomorphic Environment:
  - 2.1 Running Water and Streams: Origin & Evolution of rill, gullies, streams,
  - 2.2 Steam Channel: Classification; Characteristics; Drainage Patterns & Channel Patterns
  - 2.2 Process of Valley Development; Hydraulic geometry, longitudinal and cross profile.
  - 2.3 Stream Processes; Erosion,- Erosional Features, Transportation, Sedimentation and Deposition;- Depositional Features, Characteristics
  - 2.4.Stream flow: Laminar Flow, Turbulent Flow: Steam Velocity, Discharge
  - 2.5. Floods; Definition; causes, types, discharge measurements, velocity, flow, hydrograph, consequence, Flood Control, Flood Management
  - 2.6 Flood Plain: Morphology, Ecology, Wetland, Floodplain Management
3. The Arid and Semi-arid Geomorphic Environment
  - 3.1 Environmental Characteristics; Desert Environment; Semi-Arid Environments
  - 3.2 Fluvial Process in Arid /semi-arid Environment; Pediments and Pediplains
  - 3.3 Wind and Aeolian Land Forms: Erosional; Depositional
4. The Glacial and Periglacial Geomorphic Environments: Process and Products; Erosional Features; Depositional Features
5. Karst Topography: Conditions for Karst Development; Karst Features
6. The Marine and Coastal Geomorphic Environment: Coast: Definition, Delineation, Major environmental gradients and characteristics
  - 6.1 Coastal Classification: Open coast, closed coast, Rocky coast, muddy coast and Sandy coast
  - 6.2.Coastal Geomorphic Processes and Products; Waves, Tides, Winds, Ocean current
  - 6.3 Coastal Landform: Erosional Features; Depositional Features
  - 6.4. Coastal Sediments: Basic Concept of Sediment transport, Sediment sources, sizes, distribution
  - 6.5 Deltas: Types, Formation and Structures

- 7 Palaeo-Geomorphology:  
7.1 Geochronology : Lithostratigraphy, Biostratigraphy (pollen and diatom analysis) and Chronostratigraphy (c14 dating, dendrochronology)  
7.2 Past-Geomorphological Environments: Process and Products; Palaeo-Climatology:
- 8 Models in Geomorphology
- 9 Applied Geomorphology; Geomorphology and Agriculture; Geomorphology and Industry; Geomorphology and Urbanization; Geomorphology and Transport

### **Selected Readings**

Thornbury, W. D. Principles of Geomorphology  
 Sharma, V. K., Geomorphology: Earth Surface, Process and Forms  
 Small, R. J., The Study of Landforms  
 Sparks, B. W., Geomorphology  
 Leopold, W. and Miller., Fluvial Process in Geomorphology  
 J. Pathick A. Introduction to Coastal Geomorphology 1986  
 MS Islam Sea-Level Changes of Bangladesh: Last Ten Thousand Years, 2001

### **GETh 402 : Climatology - II**

**3 Credit Hour**

#### **1. Earth's Climate**

##### 1.1 Defining Climate

1.2 The Koeppen System: Tropical Climates (Tropical Wet (Af), Monsoon (Am), Tropical Wet and Dry (Aw); Dry Climates; Subtropical Deserts (BWh) - Subtropical Steppe (BSh), Midlatitude Deserts (BWk), Midlatitude Steppe (BSk); Mild Midlatitude Climates — Mediterranean (Csa, Csb), Humid Subtropical (Ffa, Cwa), Marine West Coast (Cfb, Cfc); Severe Midlatitude Climates - Humid Continental (Dfa, Dfb, Dwa, Dwb), Subarctic (Dfc, Dfd, Dwc, Dwd); Polar Climates — Tundra (ET), Ice Cap (EF), Highland Climates (H)

#### **2. Air Mass and Fronts**

Frontal Wave Theory of Cyclogenesis

#### **3 Lightning, Thunder and Tornadoes**

2.1. Lightning : Lightning formation - Charge Separation-Runaway Discharges- Leaders-Strokes and Flashes, Types of Lightning, Thunder, Lightning Safety

2.2 Thunderstorms; Air Mass Thunderstorms, Severe Thunderstorms, Downbursts, Hail formation in thunderstorm, Geographic and Temporal Distribution of Thunderstorms

2.3 Tornadoes; Tornado Characteristics and Dimensions, Tornado Formation, Location and Timing of Tornadoes, Trends in US/Bangladesh Tornado Occurrence, Tornado Damage and Fatalities, Watches and Warnings

#### **1. Mid latitude Cyclones**

3.1.Polar Front Theory, Cyclogenesis, Mature Cyclone, Occlusion, Movement of Cyclones

- a. Process of the Middle and Upper Troposphere - Rossby Waves and Vorticity
- b. Surface Fronts and Upper level Patterns, Cold Fronts and Formation of Upper Level Troughs, Interaction of Surface Upper –Level conditions
- c. The Modern View: Mid Latitude Cyclones and Conveyor Belts

#### **2. Tropical Storms and Cyclones**

4.1. Cyclones Around the Globe: The Tropical Setting, Cyclone/Hurricane Characteristics

- a. Cyclone/Hurricane Structure: The Eye and the Eye Wall

- b. Cyclone/Hurricane Formation: Steps in the Formation, Conditions Necessary for Cyclone/Hurricane Formation, Cyclone/Hurricane Movement and Dissipation, Cyclone/Hurricane Paths, Effect of Landfall
- c. Cyclone/Hurricane Destruction and Fatalities: Wind, Heavy Rain, Tornadoes, Storm Surges
- d. Cyclone/Hurricane Forecasts and Advisories: Cyclone/Hurricane Watches and Warnings, Cyclone/Hurricane Intensity Scale

### 3. Weather Forecasting and Analysis

- 5.1. Weather Forecasting - Both Art and Science, Impact of Weather Forecasting Forecasting Methods, Types of Forecasts, Assessing Forecasts
  - a. Data Acquisition and Dissemination
  - b. Forecast Procedures and Products: Phases in Numerical Modeling, Medium-Range Forecasts, Long-Range Forecasts and Seasonal Outlooks, Weather Maps and Images

### 4. Air Pollution and Heat Islands

- 6.1 Atmospheric Pollutants: Particulates, Carbon Oxides, Sulfur Compounds, Nitrogen Oxides, Volatile Organic Compounds (Hydrocarbons), vi. Photochemical Smog
- 6.2. Atmospheric Controls on Air Pollution: Effects of Winds on Horizontal Transport, Effect on Atmospheric Stability
- 6.3 Urban Heat Islands: Radiation Effects, Changes in Heat Storage, Sensible and Latent Heat Transfer

### 5. Climate Changes: Past and Future

- 7.1 Defining Climate Change,
  - a. The Time Scales of Climate Change
  - b. Past Climates: i. Warm Intervals and Ice Ages, ii. The Current Ice Age, iii. The last Glacial Maximum, iv. The Holocene, v. The Last Century, vi. Variation on Characteristic time Scales
  - c. Factors Involved in Climate Change: Variations in Solar Output, Changes in Earth's Orbit, Changes in Land Configuration and Surface Characteristics, Changes in Atmospheric Turbidity, Changes in Atmospheric Turbidity, Changes in Radiation-Absorbing Gases, Feedback Mechanisms
  - d. General Circulation Models: Attributing Climate change, Projecting Climate Change
  - e. Methods of Determining Past Climates: Oceanic Deposits, Ice Cores, Remnant Landforms, Past Vegetation, Relic Soils

#### Selected Readings:

- Aguado, E. and Burt, James E., *Understanding Weather and Climate*, Prentice Hall, New York, 2010.
- Ahrens, C. Donald., *Essentials of Meteorology: An Invitation to the Atmosphere*, Brooks/Cole, US, 2001.
- Wallace, John M. and Hobbs, Peter V., *Atmospheric Science: An Introductory Survey*, ELSEVIER, Amstardam. 2006.
- Reynolds, R., *Guide to Weather*, Bounty Books, London, 2004.

**GETh 403 : Political Geography****3 Credit Hour**

1. Nature, Scope and Objective of Political Geography; Political Geography and Geopolitics and Approaches in Political Geography and Geo-Political Thoughts and Concepts
2. State concept and Evaluation
  - 2.1. State as a unit : political unit
  - 2.2. Nation
  - 2.3. Nation-state
  - 2.4. Multi-national States
  - 2.5. Buffer-State
  - 2.6. Neutralised States and Territories
3. The States :
  - 3.1. Location, Area and State
  - 3.2. Boundaries, Frontiers and Territorial Waters
  - 3.3. Population
  - 3.4. Resource and Power
  - 3.5. Core Areas and Capitals
  - 3.6. Internal Organisations and Relationship
  - 3.7. External Relationships
4. World Political Patterns:
  - 4.1. Colonialism, Colonies and Decolonisation
  - 4.2. The Capitalist and the Socialist Realm
  - 4.3. The Developed and the Developing World
  - 4.4. The Big Powers-Sphere of Influence and the Balance of Power
  - 4.5. Geopolitical Theories and the Foreign Policies of Big Power
  - 4.6. World Organizations and International Relationship
  - 4.7. Areas of Contemporary Interests and International Conflicts
  - 4.8. Electoral Geography
5. Geopolitical Situation of Bangladesh
  - 5.1. SAARC-Bangladesh and ASEAN The Bridge Concept
  - 5.2. Transit, Transshipment and Asian High-way Controversy
  - 5.3. Delimitation of the Maritime Boundaries and South Talpathi Problem
  - 5.4. Chittagong Hill Tracts and Ethnicity
  - 5.5. Problem Mv Relation Sharing of Transboundary Water Resources

**Selected Readings**

Alexander, World Political Patterns  
Pounds., Political Geography  
Cohen, Geography and Politics in a Divided world  
Cohlet., Political Geography and the World Map  
Whittlesey., The Earth and the State  
Moodie., Geography Behind Politics  
Bowman., The New World  
Fairgzeve., Geography and World Power  
Saidi., Readings in Political Geography  
Percy, Fairfield and Associate  
World Political Geography  
Weigert and Others., Principles of Political Geography  
Boggs., International Boundaries  
Prescott., The Geography of Frontiers and Boundaries  
Cornish., Great Capitals  
East and Moodie, The Changing World  
East and Spate., The Changing map of Asia  
Mackinder., Democratic Ideals and Reality  
Fewett., Political Geography of the British Empire  
Robinson (ed)., Economic Consequence of the Size of Nations

Sargets., Ways of the Empire  
 Weigert, Stefansson, et. al., New Compass of the World  
 Weigert and Stefansson., Compass of the World  
 Thomsson., Danger Spots in World Population  
 Rose., Politics in Southern Asia  
 Fisher., Middle East  
 James and Jones (eds)., American Geography, Inventory and Prospects  
 Tayyab., Pakistan : A Political Geography  
 Cole,, A Geography of World Affairs  
 Braujeau Garnier., The Geography of Population

### **GETh 404: Urban Geography**

**3 Credit Hour**

1. Introduction : Subject matter, Scope and Development of Urban Geography.
2. Origin and Growth of cities : Early Urban Hearths, Factors in Urban Growth (General and Current), Pre-industrial, Industrial and modern cities.
3. Stages, Processes and Forces of Urban Growth ( centripetal & centrifugal).
4. Urbanization and Urban Growth : Patterns and Processes in MDCs and LDCs, Urbanization Curve, Over urbanization and Counter urbanization.
5. Urban Population : Characteristics and Dynamics, Population Density Gradient Model.
6. Urban Internal Structure: CBD, Core-Frame Concept, Commercial (manufacturing & retailing) areas and Residential zonation and segregation.
7. Urban Landuse Theories & Models : Bid-Rent Theory, Concentric Zone Model, Sector Theory and Multiple Nuclei Theory.
8. Hierarchy of Urban Centers : Central Place Theory, Rank-size Rule .
9. Urban Economic Base : Basic and Non-Basic Concepts, Formal & Informal Sectors.
10. Urban Transportation : Transportation & Urban Form ,Trip Generations & Commuting, Urban Transit System and problems.
11. Suburbanization, Rural-Urban Fringe/ Urban Sprawl, Satellite Towns.
12. Urban Environment: Problems and Consequences, Urban Livability.

### **Selected Readings**

Kaplan, David (2009). Urban Geography. 2<sup>nd</sup> edition, John Wiley : N.Y.  
 Kaplan, David, Wheeler James and Halloway, Steven R. (2008). Urban Geography. 2<sup>nd</sup> edition, John Wiley ; N.Y. ISBN-10 : 0471798150.  
 Pacione, Micheal (2009). Urban Geography : A Global Perspectives. 3<sup>rd</sup> edition, Routledge : N.Y.  
 Knox, Paul L. & McCarthy, Linda M. (2012). Urbanization : An Introduction to Urban Geography. Prentice Hall: N.Y.ISBN-10:0321736435, ISBN-13: 9780321736437  
 Knox, L. Paul (1994). Urbanization : An Introduction to Urban Geography.Englewood cliffs : Prentice Hall.  
 Mayer, H.M and C. F. Kohn (1959). Readings in Urban Geography. University of Chicago Press : Chicago, USA.  
 Johnston, J.H. (1967). Urban Geography. Pergamon Press: London, UK. Carter, Harold. (1982). Urban Geography. Edward Arnold : London, UK.  
 Hall, Tim. (2006) Urban Geography. Routledge : London & N.Y.  
 Murphy, Raymond E. (1996). The American City: An Urban Geography. Mcgraw hill: N.Y.  
 Northam, R. M. Urban Geography.

1. Introduction to Agricultural Geography: Definition and Scope; Methods, Themes and Concepts
2. Agricultural Origin, Development and Diffusion: Plants, Animals and Technology
3. Agricultural System: The Role of Physical, Socio-economic and technological factors: Eco-environmental and biological approaches including perception.  
Socio-Economic Concepts and Principles: Land, Labour, Capital and Scale of Production; Ownership Tenancy, Farm Size; Intensification, Co-operation and Mechanization; Transportation and Marketing; Processing and Storing; Agricultural Organization: Peasant Farming, Commercial Farming
4. Models in Agriculture : Crop Combination Regions (Weaver Model); theoretical Approach to Agricultural Landuse Patterns: Input-Output Relationships; Agricultural location in relation to market, distance - Function and landuse (Von Thunen); Decision-Making under risk and Uncertainty (Game Theory Model); including behavioural models- Diffusion concept in agriculture.
5. Agricultural Classification : Regionalization of agricultural patterns, Types and Typology of Agriculture, Agricultural systems of the world (Whittlesey's).
6. Agriculture in Bangladesh: Nature and characteristics, Types, Patterns, Landuse, Crop Diversification, Intensity; Recent Trends, Govt. Policies, Food security and prosperity of Agriculture in Bangladesh.

**Suggested Readings**

- A. Aliam,: Agriculture of Bangladesh  
B.M. Rogers : Diffusion of Innovations  
D. R. Harris: The Ecology of Agricultural Systems in Trends in Geography, Coke R.V. and Johnson, J. H. (eds)  
D.B.Grigg : Agricultural systems of the world  
Duckhan :The Fabric of Farming  
H. F. Gregor: Geography of Agricultures Themes in Research  
H.H. McCarty: Agricultural Geography" in (ed) S.E. Jones and C.F. Jones  
J. Burton : Types of Agricultural Occapance of floodplains in the United States (Dept. of Geography, University of Chicago) Res. Pap. 75  
J. R. Tarrant: Agricultural Geography  
J.D. Henshall: Models of Agricultural Activity in socio-economic Geography(ed) R.J. Chorley and Peter Haggett  
L. D. Stamps: The Land of Britain : Its Use and Misuse  
L.D. Stamp: Applied Geography  
M. Chisholm : Geography and Economics  
T. Hagerstrand : The Propagation of Innovation Waves, Land Studies in Geography, Series-B. Human Geography  
T. R. Saarieen: Perceptions of the drought Hazard on the Great Plains, Res. Paper 196, Dept. of Geography, University of Chicago  
W.B. Moefan and R.J.C. Muntan : Agricultural Geography  
W.C. Found: Theoretical Rural Land Use  
Madjid, H. : Systematic Agricultural Geography  
Sing, J and Dhillon : Agricultural Geography  
Brammer, Hugh : Land Use and Land Use Planning in Bangladesh  
Brammer, Hugh : Agricultural Development Possibilities in Bangladesh.  
Hossain, Mosharraf: Agriculture in Bangladesh.  
Faruquee, Rashid: Bangladesh Agriculture in the 21<sup>st</sup> Century.  
Mandal & Dutta: Crop diversification.

**1. Environmental Management: Theory, Principles and Key Concepts**

- 1.1 Key terms and concepts
- 1.2. Evolution of Environmental Management
- 1.3 Approaches to environmental management (*Ad hoc*; Systems; Problem-solving; Regional; Political economy; Human ecology; Commercial; Voluntary sector; Specialist discipline)

**2. Environmental Protection Principles: sustainability, polluter pays, precautionary equity, human rights**

**3. Economics of the Environment : Models, dynamics, Property rights, Economics of pollution control, Environmental value**

**4. Environmental Planning**

- 4.1 Strategic environmental management
- 4.2 Environmental planning framework
- 4.3 Understanding environmental problems

**5. Practice of Environmental Management**

- 5.1 Pollution and waste management
- 5.2 Tourism and environmental management
- 5.3 Urban environmental management
- 5.4 Ecosystem planning and management

**6. Environmental Hazards and Risk Assessment**

- 6.1 Defining hazards, vulnerability, risk and exposure
- 6.2 Natural and man-made hazards
- 6.3 Pressure and Release Model (PAR)
- 6.4 Access Model
- 6.5 Methods for an integrated risk assessment
- 6.6 Regions of risk model
- 6.7 Place of vulnerability model

**7. Environmental Management Tools and Techniques**

- 7.1 Environmental management methods, tools and techniques
- 7.2 Techniques of environmental risk assessment and management (Methods of Ecological, Health and Industrial risk assessment)
- 7.3 Life cycle assessment (LCA)
- 7.4 Environmental Impact Assessment (EIA): steps of an ideal EIA and preparation of an EIA report
- 7.5 Environmental accounting and auditing
- 7.6 Environmental reporting
- 7.7 GIS and Remote sensing techniques in environmental management

**Suggested Readings**

- Barrow, C.J., 1999. Environmental management for sustainable development, Routledge, London.
- Barrow, C.J., 2002. Environmental management: principles & practice, Routledge, London.
- Barrow, C.J., 2005. Environmental management and development, Routledge Publications, London.
- Beder, S., 2006. Environmental principles and policies: an interdisciplinary introduction, Earthscan, Australia.
- Boyce, J.K., 2002. The political economy of the environment, Edward Elgar, Cheltenham, USA.
- Chen, Z. and Li, Heng, 2006. Environmental management in construction: a quantitative approach, Taylor & Francis, London.
- Cotherns, C.R., 1996. Handbook for environmental risk decision making, Lewis Publishers, Washington D.C. USA.

- Cutter, S.L., 1993. Living with risk, Edward Arnold, London.
- De, A.K. and De, A.K., 2005. Environmental studies, New Age International Limited, New Delhi.
- Fox, J., Rindfuss, R.R., Walsh, S.J. and Mishra, V., 2004. People & the environment: approaches for linking household and community services to remote sensing & GIS, Kluwer Academic Publishers, Boston.
- Grafton, R.Q., Adamowicz, W., Dupoint, D., Nelson, H., Hill, R.J. and Renzetti, S., 2004. Economics of the environment and natural resources, Blackwell Publishing, Malden, USA.
- Greiving, S., Fleischhauer, M. and Lucknkotter, J., 2006. A methodology for an integrated risk assessment for spatially relevant hazards, *Journal of Environmental Planning and Management*, 49 (1), 1-19.
- Hewitt, K., 1997. Regions of risk: a geographical introduction to disasters. Longman, Harlow.
- Hukkinen, J., 1999. Institutions of environmental management: constructing mental models & sustainability, Routledge, London.
- Kemp, D.D., 2004. Exploring environmental issues: an integrated approach, Routledge, London.
- Nadu, C.N., 2007. Environmental planning and management, Imperial College Press, London.
- Nath, B., Hens, I., Compton, P. and Devuyt, D. (Eds.), 1998. Environmental management in practice- Volume 1, Routledge, London.
- Oldfield, F., 2005. Environmental change: key issues and alternative perspectives, Cambridge University Press, Cambridge.
- Patt, A.G., Schroter, D., Klien, R.J., Vega-Leinert, C. de la (Eds.), 2009. Assessing vulnerability to global environmental change, Earthscan, London.
- Seppelt, R., 2003. Computer-based environmental management, Wiley-VCH GmbH & Co. KGaA, Germany.
- Skidmore, A., (Eds.), 2002. Environmental modeling with GIS and remote sensing, Taylor and Francis, London.
- Sullivan, R. and Wyndham, H., 2001. Effective environmental management: principles & case studies, Allen & Unwin, NSW, Australia.
- Wisner, B., Blaikie, P., Cannon, T. and Davis, I., 2004. At risk: natural hazards, people's vulnerability and disasters, Routledge, London.

#### **GETh 407 : Regional Geography and Environment of South Asia**

**4 Credit Hour**

1. Introduction
  - 1.1 Defining the region and Geographical Location, Land and borders
  - 1.2 History of South Asia as a Geographical Regions
  - 1.3 Member Countries
  - 1.4 Basic Demographic and Socio-economic Data Base
  
2. Natural Landscape of South Asia
  - 2.1 The Natural Landscape
  - 2.2 Climatic Division
  - 2.3 Natural Vegetation
  - 2.4 Soil
  
3. Cultural Environment of South Asia
  - 3.1 Ethnic Mosaic
  - 3.2 Population
    - 3.2.1 Population Growth
    - 3.2.2 Population Composition
    - 3.2.3 Population Dynamics
  - 3.3 Economy
    - 3.3.1 Economic Pattern
    - 3.3.2 Links to global economy
  - 3.4 Agriculture
    - 3.4.1 Agricultural Systems
    - 3.4.2 Major Crop Productions
    - 3.4.3 Green Revolution & Food Security



- 3.5 Industry & Trade
  - 3.5.1 Large Scale Industry
  - 3.5.2 Medium & Small Scale Industry
  - 3.5.3 Industrial Policies

- 4. Major Problems and Co-operation of South Asia
  - 4.1 Environmental Problems
  - 4.2 Water Sharing of Major Rivers
  - 4.3 Introduction to SAARC

### **Selected Readings**

Bradshaw White Dymond Chack - Contemporary World Regional Geography  
 H.J. Blijj Peter O. Muller – Geography: Realms, Regions and Concepts  
 Dutt, Ashok K and Margaret M. Geils, Atlas of S.A.. Westview Press, London, 1987  
 Kuniyan, George, Indian A General Survey, National Book Trust. New Delhi, 1970  
 John, B.L.C., South Asia : Heinemann Educational, London  
 Spate, O.H.K. & et. al., Indian, Pakistan and Ceylon, The Regions, Methuen & Co. London, 1967  
 Spate, O.H.K. & A.T.A. Learmonth, India and Pakistan, Methuen & Co. London, 1967  
 Davis, K., The Population of India & Pakistan. University Press, Prenceton: 1951  
 Wadian, D.N., Geology of India. Macmillan & Co. London. 1966  
 Abbasi, Bushra Afzal, Geography of South Asia, Sang-e-Meel Publication, Lahore: 1991

### **GETh: 408 Transport Geography**

**3 Credit Hour**

- 1. Study of Transport in Geography**
  - 1.1 Definition and Scope
- 2. Transport and Space**
  - 2.1 Physical constraints
  - 2.2 Overcoming barriers
  - 2.3 Transport and Spatial Structure
  - 2.4 Space/Time Relationship
- 3. Morphology of Transport Modes**
  - 3.1 Road
  - 3.2 Railways
  - 3.3 Waterways
  - 3.4 Airways
  - 3.5 Pipelines
- 4. Transport and Urban Development**
- 5. Transport Problems in Urban Areas**
- 6. Transport and Environment**
- 7. Globalization of Trade and Transport: Multimodalism**
- 8. Models in Transport and Development**
  - 8.1 Taffee, Morrill and Gould Model
  - 8.2 The Rimmer Model
  - 8.3 The Vance Model
- 9. Stages of Transport Development in Bangladesh**
  - 9.1 Early and Mughal Period
  - 9.2 Colonial Period
  - 9.3 Pakistan Period
  - 9.4 Post Independence Period

## 10. History and Development of various Modes of Transport in Bangladesh

- 10.1 Roads
- 10.2 Railways
- 10.3 Waterways
- 10.4 Airways

11. Assignments for power point presentation on contemporary issues on Transport in Bangladesh.

### Selected Readings:

Hoyle, B and Knowles, R.D. eds. Modern Transport Geography. London. Belhaven Press. London  
Rodrigue, JP, Comtois, C and Slack, B. The Geography of Transport Systems. 2<sup>nd</sup> ed. Routledge. London.

Hilling, D. Transport and Developing Countries. Routledge. London.

White, H.P and Senior, K.L. Transport Geography. London

Burke, M. Transport and Trade. Oliver and Boyd. London.

## GETh 409 : Landuse Planning and Development

3 Credit hour

1. Landuse : Concept, issues and a theme in Geographical perspective
2. Landuse Studies: data, conceptual problems and the users of landuse data
3. Theoretical underpinnings and approaches to landuse studies
  - Key factors affecting landuse
  - Theories and models of landuse and spatial organization
4. Approaches to landuse planning and development
5. Location and spatial distribution of landuse
6. Landuse survey : tools, techniques, methodology and management of landuse data
7. Landuse in Bangladesh and other countries.
8. Principles of landuse and land evaluation
9. Landuse classification
10. Landuse Planning for sustainable Development
  - concepts of landuse planning
  - carrying capacity of land
  - sustainable landuse for Development
  - Landuse zoning
  - conservation of land resource
  - landuse planning
  - land reforms for equitable development
11. Urban landuse: A different dimension
  - Factor influencing urban landuse
  - Major issues in urban landuse
  - Urban landuse classification
  - Urban landuse planning in Bangladesh
12. Landuse policies and related Planning issues in Bangladesh
  - Landuse policy
  - National Water Policy
  - Environment Policy and Act
  - Agriculture Policy/crop production policy/Agriculture Extension Policy
  - Forest and Nature conservation Act
  - Bio-Diversity Act
  - Coastal Zone Policy
13. Climate Change and Adaptation through Landuse Planning
  - National Adoption Programme (NAPA)
  - Bangladesh climate change strategy and Action Plan

**Selected References:**

- Beek, K. J Land Evaluation for Agricultural Development ILRI Publication, 23, Wageningen, The Netherlands
- Freeman, T. W. Geography and Planning, London: Hutchinson University Library
- Dent, D. & A. Young Soil Survey and Land Evaluation, George Allen and Unwin, London
- F.A.O (1976) Framework for Land Evaluation, Soils Bulletin No. 32
- F.A.O. (1978) Report on the Agro-Ecological Zones Project, Methodology and Results for Africa, World's Soil Resources Report
- Harwood, R. R. & E. C. Price Multiple Cropping in Tropical Asia, Symposium "Multiple Cropping" of the American Society of Agronomy, August 1975.
- Islam, M. A. Environment, Land Use and Natural Hazards in Bangladesh, Dhaka: Dhaka University
- Lounsbury, F. L. & Aldrich, F. T. Introduction to Geographic Field Methods and Techniques, London: Charles E. Merrill Publishing Company
- Mandal, R. B. Land Utilization: Theory and Practice, Delhi: Concept Publishing Company
- Pierce, J. T. The Food Resource, New York: Longman Scientific and Technical
- Purnell, M. F. The FAO Approach to Land Evaluation and Its Application to Land Classification for Irrigation

**GELb 410 : GIS –III: Spatial Analysis and Modeling****2 Credit Hours****Theory Lectures****1. Spatial Analysis & Modeling**

Organizing Geographic Data for analysis; Classification of GIS Analysis Functions; Maintenance and Analysis of Spatial Data; Maintenance and Analysis of Non-Spatial Data; The Analysis of Discrete Entities in Space; Spatial Analysis Using Continuous Fields.

**2. Techniques in Spatial Decision Support System**

Multi-criteria evaluation; Linear Programming; Rule-based Systems; Network Analyses; Spatial Interaction Modelling; Genetic Algorithms;

**3. Statistical Surfaces: Digital Terrain Modelling**

What are Surfaces? Surface mapping: DTM vs. DEM; Terrain Data Sampling; Raster Surfaces; Interpolation; Terrain Reclassification; Slicing statistical surface; Discrete surfaces.

**4. Introduction to various GIS applications**

- a) Land use planning;
- b) Health Care Management,
- c) Risk and Hazard Management,
- d) Policing and local administration.

**Lab Sessions:** (Using the Tutorial Book by Wilpin L. Gorr and Kristen S. Kurland available at the GIS Lab)

**5. Spatial Analysis****6. ArcGIS 3D Analyst****7. ArcGIS Spatial Analyst****8. GIS Project work:** (to be designed by the Course Teacher incorporating all the skills so far learned from the above lab exercises)

**Selected Readings:**

**C.P. Lo & Albert K. W. Yeung** (2002), *Concepts and techniques of Geographic Information Systems*, Prentice-Hall, New Delhi, India.

**Ian Heywood, Sarah Cornelius and Steve Carver** (1999), *An Introduction to Geographical Information Systems*; Longman, UK.

**Peter A. Burrough and Rachael A. McDonnell** (1998), *Principles of Geographical Information Systems*, Oxford University Press, UK.

**Stan Aronoff** (1995), *Geographic Information Systems: A Management Approach*, WDL Publications, Ottawa, Canada.

**Christopher B. Jones** (1999), *Geographical Information Systems and Computer Cartography*, Longmans, UK.

**Michael N. Demers** (2003), *Fundamentals of Geographic Information Systems*, John Wiley & Sons Ltd. USA.

**GETb 411: Remote Sensing –III: Thermal and Microwave Remote Sensing 2 Credit Hours****Thermal Radiation Principles and Thermal Remote Sensing**

- 1.1 Thermal radiation principles, thermal process and properties
- 1.2 Characteristics of thermal IR images and Factors affecting thermal images
- 1.3 Interaction of thermal radiation with terrain elements
- 1.4 Multi-spectral thermal data

**Labs:**

1. *Brushing-up the image processing software*
2. *Looking inside the thermal data by using IPS ( Image Processing Software)*

**Interpretation and Applications of Thermal Image**

- 2.1 Thermal image and qualitative interpretation,
- 2.2 Semi quantitative analysis
- 2.3 Temperature mapping with thermal scanner data
- 2.4 Applications of thermal sensing

**Labs:**

3. *Quantitative interpretation of thermal Image*
4. *Thermal mapping by using appropriate satellite image*
5. *Applications of thermal image: web-search*

**Microwave Remote Sensing**

- 3.1 Introduction to microwave remote sensing – Concept and principle, back-scattering, cross section Wavelength, incidence angle, aspect angle.
- 3.2 Interactions between radar and surface materials - complex dielectric properties, roughness polarization
- 3.3 Passive microwave sensors
- 3.4 Active microwave sensors

**Labs:**

6. *Interpretation of microwave image by using appropriate IPS*

**Radar Imagery**

- 4.1 Side looking radar system
- 4.2 Geometric characteristics of Side looking radar images
- 4.3 Synthetic aperture radar
- 4.4 Transmission characteristics of radar signals and other radar image characteristics

**Labs:**

7. *Exploring Radar imagery by using appropriate IPS*
8. *Exploring the Synthetic aperture RADAR imagery*

**Radar Image Interpretation**

- 5.1 Radar image interpretation
- 5.2 Fundamentals of radar interferometry
- 5.3 LIDAR – working principle, scope and applications
- 5.4 Applications of microwave remote sensing

**Labs:**

9. *Interpretation and information extraction from RADAR image*
10. *Interpretation of LIDAR image by using appropriate IPS*

**Selected Readings:**

- Drury, S.A., 1987: Image Interpretation in Geology. Allen and Unwin  
Gupta, R.P., 1990: Remote Sensing Geology. Springer Verlag.  
Jensen, J.R. 2000: Remote Sensing of the Environment: An Earth resource Perspective. Prentice Hall  
Joseph George, 2003: Fundamentals of remote sensing. Universities Press  
Lillesand, T.M., and Kieffer, R.M., 1987: Remote Sensing and Image Interpretation, John Wiley.  
Sabbins, F.F., 1985: Remote sensing Principles and interpretation. W.H. Freeman and company

**GELb 412: Techniques in Physical Geography**

**2 Credit**

- 1 Laboratory techniques in physical geography: Introduction, types, measurements, Qualitative & Quantitative Analysis, Applications
- 2: Study of Fluvial Process: Morphometric Analysis, Discharge and Flood Frequency Analysis; Analysis of Long Profile and Cross-section Geometry
- 3 Study of Meteorological Process: Rainfall and Temperature trend study
4. Study of Rocks and Minerals: Principle, Type, Identification, properties
5. Study of Physical Properties of Soil: Colour, Soil Humidity, Bulk-density, Porosity and Voids ratio, Soil Texture, Grain Shape. Heavy Minerals, Mica,
6. Particle Size Analysis: Sieve Method, Hydrometer Method, Pipette Method with merits and demerits
7. Study of Macrofossil and Microfossils: Fossil Woods; Pollen Analysis; Diatom Analysis; Foraminifera Analysis:

**References:**

- Gouide A (1990) Techniques in Physical Geography, Routledge, London  
Braisier, MD. (1979) Microfossil, Chapman and Hall, London

**GELb 413 : Environmental Analysis**

**2 Credit Hour**

1. Introduction to Environmental Analysis: Definition, Qualitative & Quantitative Analysis, Techniques, Applications

2. Chemical Properties of Soil: Soil pH, NPK, Conductivity, Organic Carbon, Fe, S, NO<sub>x</sub>, SO<sub>x</sub>, PO<sub>x</sub>
3. Chemical Properties of Water: Conductivity, Salinity, Water pH, Hardness, DO, BOD, COD, Trace Elements, Heavy Metals, Chloride, NO<sub>x</sub>, SO<sub>x</sub>, PO<sub>x</sub>
4. Pollution Study: Solid Waste; industrial waste water; industrial effluents; river water
5. Noise and Air Pollution: Analysis and Monitoring
6. Environmental Impact Assessment (EIA): Practices of EIA on a development project by individual student

### **Selected Readings**

Manahan, Stanley, E. (2000); *Environmental Chemistry*, Lewis Publication,  
 De, Anil Kumar (2007) *Environmental Chemistry*, New Age Pub. New Delhi,  
 Asthana, D.H. and Meera Asthana (???) *Environmental Problem and Solution*, S.Chand & Co Ltd, New Delhi.  
 Stephen H Stoker and Spencer, L Seager (1970) *Environmental Chemistry*, Scot, Foreseman and Company, USA

### **GELb 414 : Landuse Survey**

**2 Credit hour**

This course is will train students in field techniques and methods of rural and urban land use survey, environmental analysis and socio-economic studies. The department on a selected theme will arrange Field Camps, which are compulsory, and each student will have to produce a report on the field camp investigation.

### **GEV 415 : Viva**

**2 Credit hour**