

UOS/CE/No. 2763
20-6-17

UNIVERSITY OF SARGODHA, SARGODHA

NOTIFICATION

No. UOS/Acad/571

Dated: 19.06.2017

On the recommendation of Academic Council dated 23.08.2016, the Syndicate in its 1/2017 meeting held on 15-16.05.2017 has approved the syllabi of BS, MS & Ph.D program in Geology and BS & M.Sc program in Geography as per following detail:

- i) Revised curricula of BS, MS & Ph.D program in Geology for implementation w.e.f session 2016-17 (Annex-'A', 'B' & 'C' respectively).
- ii) Revised curricula of BS & M.Sc Geography program for implementation w.e.f session 2016-17 (Annex-'D' & 'E' respectively).

(ANJAD HUSSAIN JANJUA)
Deputy Registrar (Acad)
for Registrar

19/06/17
19/06/17

Distribution:

- Chairman, Department of Earth Sciences
- Controller of Examinations
- Web-Developer
- Notification file.

(for uploading on university web-site)

C.C:

- Dean, Faculty of Science
- Secretary to the Vice-Chancellor
- P.A. to Registrar

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Asif Nasir

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Annex - 'D'

BS Geography.

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Scheme of Studies for BS Geography Programme

Total credit hours: 130

Year 1

Semester I

Semester II

Course code	Course Title	Credit	Course	Course Title	Credit.
GEOG-101	Fundamentals of Geography	3(3-0)	GEOG-102	Physical Geography	3(3-0)
ENG-101	English I	3(3-0)	ENG-102	English II	3(3-0)
BIST-109	Islamic Studies	2(2-0)	PKST-112	Pakistan Studies	2(2-0)
MATH-101	Algebra and Trigonometry:	3(3-0)	MATH-102	Calculus & Analytical	3(3-0)
GEOG-105*	Introduction to Geology	3(3-0)	ENVR-104*	Environmental Geology	3(3-0)
ENVR-101*	Introduction to Environmental Sciences	3(3-0)	CHEM-102*	Physical Chemistry	3(3-0)
TOTAL		17	TOTAL		17

Year 2

Semester III

Semester IV

Course code	Course Title	Credit.	Course	Course Title	Credit.
GEOG-201	Human Geography	3(3-0)	GEOG-230	Geography of Pakistan	3(3-0)
ENG-201	English III	3(3-0)	GEOG-280	Surveying	3(1+2)
GEOG-221	Map Work	3(3-0)	ENG-202	English IV	3(3-0)
STAT-201*	Statistics I	3(3-0)	PSYC-203*	Psychology	3(3-0)
SOCI-204*	Sociology	3(3-0)	ECON-206*	Introductory	3(3-0)
COMP-202	Introduction to Computer	3(3-0)	TOTAL		15
TOTAL		18	TOTAL		15

*as notified by the Chairman from list A.

Year 3

Semester V

Semester VI

Course	Course Title	Credit.	Course	Course Title	Credit.
GEOG-301	History and Development of Geographic Thought	3(3-0)	GEOG-310	Oceanography	3(3-0)
GEOG-302	Geomorphology	3(3-0)	GEOG-311	Environmental Geography	3(3-0)
GEOG-303	Climatology	3(3-0)	GEOG-312	Research Methods	3(3-0)
GEOG-304	Economic Geography	3(3-0)	GEOG-313	Regional Concepts	3(3-0)
GEOG-305	Quantitative Methods	3(3-0)	GEOG-314	Geographic Information System	3(3-0)
GEOG-306	Principles of Cartography	3(1+2)			
TOTAL		18	TOTAL		15

Year 4

Semester VII

Semester VIII

Course	Course Title	Credit.	Course	Course Title	Credit.
GEOG-410	Remote Sensing	3(3-0)	GEOG-413	Population Geography	3(3-0)
GEOG-411	Urban Geography	3(3-0)	GEOG-409	Hydro Geography*	3(3-0)
GEOG-412	Digital Image Processing	3(3-0)	GEOG-428	Political Geography*	3(3-0)
GEOG-491	South Asia**	3(3-0)	GEOG-493	Demographic Survey***	6
GEOG-422	Cultural Geography*	3(3-0)	GEOG-500	Thesis (in lieu of Two papers)	6 (3+3)
TOTAL		15	TOTAL		15

*as notified by the Chairman from list B.

**as notified by the Chairman from list C.

***as notified by the Chairman from list D.

A: Elective Papers:-

- GEOL. 105 Introduction to Geology
- ENVR. 101 Introduction to Environmental Sciences
- ENVR. 104 Environmental Geology
- CHEM. 102 Physical Chemistry
- CHEM. 101 Inorganic Chemistry
- POL. 201 Political Science
- ECON. 206 Introductory Economics
- PHY. 203 Physics
- PSYC. 203 Psychology
- SOCI. 204 Sociology
- STAT. 201 Statistics I
- STAT. 202 Statistics II

B: Optional Papers:-

- GEOG. 420 Agricultural Geography
- GEOG. 421 Conservation of Resources
- GEOG. 422 Cultural Geography
- GEOG. 423 Natural Hazards & Disaster Management
- GEOG. 424 Geography of Manufacturing
- GEOG. 425 Hydro Geography
- GEOG. 426 Medical Geography
- GEOG. 427 Pleistocene Geomorphology
- GEOG. 428 Political Geography
- GEOG. 429 Regional Planning & Development
- GEOG. 430 Settlement Geography
- GEOG. 431 Tourism Geography
- GEOG. 432 Transportation Geography
- GEOG. 434 Quaternary Geomorphology
- GEOG. 435 Coastal Morphology
- GEOG. 436 Fluvial Morphology
- GEOG. 437 Glaciology
- GEOG. 438 Desert Morphology
- GEOG. 439 Soil Geography
- GEOG. 440 Meteorology
- GEOG. 441 Climate Change Studies
- GEOG. 442 Plant Geography
- GEOG. 443 Zoo Geography
- GEOG. 444 Sedimentation and Stratigraphy
- GEOG. 445 Social Geography
- GEOG. 446 Geography of Migration and Regional Development
- GEOG. 447 Behavioural Geography

- GEOG. 448 Historical Geography
- GEOG. 449 Geography of Religions
- GEOG. 450 Geography of Crimes
- GEOG. 451 Gender Geography
- GEOG. 452 Geography of Marketing
- GEOG. 453 Industrial Geography
- GEOG. 454 Urban and rural land use Studies
- GEOG. 455 Regional Planning and Development
- GEOG. 456 Geography of Housing
- GEOG. 457 Geography of Health Care
- GEOG. 458 Geography of Nutrition
- GEOG. 459 Military Geography
- GEOG. 460 Geography of Administration
- GEOG. 461 Geo-Archaeology
- GEOG. 462 Geography of prehistoric cultures & Civilizations
- GEOG. 463 Environmental perceptions in Geography
- GEOG. 464 Quantitative Geography
- GEOG. 465 Geography of Natural Hazards and Disasters
- GEOG. 466 Applied Geomorphology
- GEOG. 467 Development Planning
- GEOG. 468 Sustainable Development of Natural Resource
- GEOG. 469 Environmental Impact Assessment (EIA)
- GEOG. 470 Applied Cartography
- GEOG. 471 Social Impact Assessment (SIA)
- GEOG. 472 Mountain Geography
- GEOG. 473 Geography of Retailing
- GEOG. 474 Urban Environmental Planning & Management
- GEOG. 475 Geography of Wetlands
- GEOG. 476 Urban Planning
- GEOG. 477 Urban and Landscape Ecology
- GEOG. 478 Geography of Boundaries & Conflicts
- GEOG. 479 Natural Resources Research

C:

Regional Geography:-

- GEOG. 480 Africa: South of Sahara
- GEOG. 481 Australia
- GEOG. 482 Central Asia
- GEOG. 483 Eastern Asia China, Japan & Korea
- GEOG. 484 Europe
- GEOG. 485 Geography of the Muslim World
- GEOG. 486 North African Countries

- GEOG. 487 North America
- GEOG. 488 Russia
- GEOG. 489 S. West Asia
- GEOG. 490 South America
- GEOG. 491 South Asia
- GEOG. 492 South East Asia

Field Survey Report

The students shall carry out field survey on any one of the following fields:

- GEOG. 493. Demographic Survey
- GEOG. 494. Hydrological Survey
- GEOG. 495. Industrial Survey
- GEOG. 496. Land Use Survey
- GEOG. 497. Landforms Survey
- GEOG. 498. Soil Survey
- GEOG. 499. Urban Survey

Each student shall be required to collect data/information pertaining to his/her topic in a selected area/region, tabulate the data and write report on it.

GEOG 500: Thesis

(In lieu of two optional papers in semester VIII)

DETAIL OF COURSES

GEOG 101

Fundamentals of Geography

Objective:

To expose students with the founding principles of Geography and geographical knowledge.

Course outline:

- o Introduction
- o Definitions, scope and branches of Geography
- o Roots of the discipline and basic geographic concepts
- o Themes and traditions of Geography
- o Tools of Geography
- o The Universe
- o Galaxies and solar system
- o The Earth as a planet
- o Celestial positions, its shape and size
- o Rotation, revolution and related phenomena
- o Spheres of the earth
- o Lithosphere
- o Atmosphere
- o Hydrosphere
- o Biosphere
- o Man-environment interaction
- o Population
- o Major Economic activities
- o Settlements
- o Pollution

Lab. work:

Comprehension of atlases, map reading skills, location of places, features and relevant work related to topics of the theoretical section.

Recommended Books:

1. Arbogast, A. F. (2007) *Discovering Physical Geography*, John Wiley and Sons, London.
2. Christopherson, R. W. (2009) *Geo systems: An introduction to Physical Geography*, Pearson Prentice Hall, New Jersey.

Reference Books:

1. De Blij, H. J and Muller, P. O. (1996) *Physical Geography of the Global Environment*, USA, John Wiley and Sons Inc., New Jersey.
2. Guinness, J. P. & Nagle, G. (2011) *Geography*, Hodder Education, London.

3. King, C. (1980) Physical Geography, Basil Blackwell, Oxford.
4. Miller, G. T. (2008) Living in the Environment, Principles, connections and Solutions, Wadsworth, USA.
- Monkhouse, F. J. (1996) Principles of Physical Geography, Hodder & Stoughton, London.
5. Scott, R. C. (1996) Introduction to physical geography, West Publishing Co, New York.
6. Small, R. J. (1989) Geomorphology and Hydrology, Longman, London.
7. Strahler, A. (2013) Introduction to Physical Geography, John Wiley & Sons, New Jersey.
8. Stringer, E. T. (2004) Modern Physical Geography, John Wiley, New York.
9. Taylor, J. (1993) Integral Physical Geography, Longman, London.
10. Thompson, R. D. (1986) Process in Physical Geography, Longman, London.
11. Thornbury, W. D. (2004) Principles of Geomorphology, John Wiley & Sons, New York.
12. Thurman, H. V. & Trujillo, A. P. (2013) Essentials of Oceanography, Prentice Hall Inc., USA.

GEOG 102

Physical Geography

Objective:

To create understanding about the physical characteristics of the earth

Course outline:

1. Introduction
2. Definition, scope and major branches
3. Realms of the physical environment
4. Lithosphere
5. Internal structure of earth
6. Rocks—origin, formation and types: Igneous, Sedimentary and Metamorphic Rocks
7. Plate tectonics, mountain building forces
8. Geomorphic processes – endogenic and exogenic processes and their resultant landforms
9. Earthquakes and volcanic activity, folding and faulting
10. Weathering, mass wasting, cycle of erosion, erosion and deposition
11. Landforms produced by running water, ground water, wind and glaciers
12. Atmosphere
13. Composition and structure of atmosphere
14. Atmospheric temperature and pressure, global circulation
15. Atmospheric moisture and precipitation
16. Air masses and fronts
17. Cyclones and other disturbances
18. Hydrosphere
19. Hydrological cycle
20. Ocean composition, temperature and salinity of ocean water
21. Movements of the ocean water; waves, currents and tides
22. Biosphere
23. Eco-systems
24. Formation and types of soils

Lab. Work:

Identification of rocks and minerals, study and identification of landform using Satellite imageries and Topographic Sheets. Construction and applications of models showing various types of landforms. Observation and recording of weather data from a mini weather station.

Field visits:

Ground truthing and identification of various types of rocks, fluvial, glacial, desert landform, type of soils.

Visit to any suitable area to observe and appreciate the characteristics of physical features (recommended areas: Mountainous, Plains, Plateaus, deserts and coastal areas).

Visit to any national park/biosphere reserves; Soil Survey of Pakistan, Geological survey of Pakistan, Meteorological station/observatory and National Institute of Oceanography (NIO) and SUPARCO. Observations about the clouds and identification of their types

Recommended Books:

1. Strahler, A. (2013) Introduction to Physical Geography, John Wiley & Sons, New Jersey.
2. Thurman, H. V. & Trujillo, A. P. (2013) Essentials of Oceanography, John Wiley & Sons, New Jersey.

Reference Books:

1. King, C. A. M. (1980) Physical Geography, Basil Blackwell, Oxford.
2. McIveen, J. F. R. (1992) Fundamentals of Weather and climate, Prentice Hall, New Jersey.
3. Hall, New Jersey.
4. Monkhouse, F. J. (1996) Principles of Physical Geography, Hodder & Stoughton, London.
5. Peterson, J. F., Sack, D. & Gabler, R. E. (2011) Physical Geography, Brooks Cole.
6. Scott, R. C. (1996) Introduction to physical geography, West Publishing Co, New York.
7. Small, R. J. (1989) Geomorphology and Hydrology, Longman, London.
8. Strahlar, A. N., Strahlar, A. H. (2004) Physical Environment, John Wiley, New York.
9. Stringer, E. T. (2004) Modern Physical Geography, John Wiley, New York.
10. Thornbury, W. D. (2004) Principles of Geomorphology, John Willy & Sons, New York.

GEOG 201

Human Geography

Objective:

This course attempts to impart knowledge about the relationship between man and environment human activities including natural resources and related

Course outline:

1. Introduction
2. Definition, scope and branches
3. Basic approaches
4. Environmental determinism
5. Possibilism
6. Probabilism

7. Cognitive behaviourism
8. Coupled nature-human systems
9. Population and its characteristics o Population distribution
10. Population structure and composition
11. Population dynamics (fertility, mortality, migration etc.)
12. Economic activities
13. Classification of Economic Activities
14. Agriculture, mining, forestry, animal husbandry and poultry
15. Industries: cottage, light and heavy
16. Trade, transport and services
17. Tourism
18. Settlements
19. Theories of human settlement
20. Types of settlements
21. Rural settlements
22. dispersed, nucleated and Ribbon settlements o Urban Settlements
23. Urban hierarchy and functions Urbanization
24. Process of urbanization
25. Urban structure, morphology and theories
26. Land use and land cover patterns
27. Environmental issues; causes and remedies

Field visits:

- To explore economic activities in the context of natural environment of relevant area/region.
- To study rural and urban settlements, industrial areas and national parks.

Recommended Books:

1. Ahmed, Q. S. (2001) Fundamentals of Human Geography, Royal Book Company, Karachi.
2. Becker, A. & Secker. (2002) Human Geography: Culture, Society, and Space, John Wiley and Sons, New Jersey.

Reference Books:

1. Becker, A. & Secker. (2002) Human Geography: Culture, Society, and Space, New York; John Wiley and Sons, New Jersey.
2. Benko, G. & Shorhmay. (2004) Human Geography: A history for the 21st century, Hodder Arnold, London.
3. Blij, H. J. D. (2002) Human Geography: Culture, Society, and Space, John Wiley and Sons, New Jersey.
4. Cloke, P. & Crang, P. (2005) Introducing Human Geographies, 2nd edition, Hodder Arnold, London.
5. Fouberg, E. H. (2012) Human Geography People, Place and Culture, John Wiley & Sons, Inc., Hoboken.
6. Getis, A. & Getis, J. (2005) Human Geography: Landscape of Human Activities, McGraw Hill Higher Education, Boston.
7. Harper, H. L. (2003) Environment and Society: Human Perspectives on Environmental Issues, John Wiley & Sons, Hoboken.

8. Prentice Hall, New York.
 Knox, P. L. & Marston, S. A. (2012) Places and Regions in Global Context: Human Geography, Prentice Hall, New York.
 9. Lewis, C. P., Mitchell F. & Dyer, C. (2001) Village, Hamlet and Field: Changing Media Settlements in Central England, Windgather Press, London.
 10. Neuwirth, R. (2006) Shadow Cities: A Billion Squatters, A New Urban World, Routledge, London
 11. Rubenstein, J. M. (2012) Contemporary Human Geography, PHI Learning Private Limited, N Delhi.

GEOG 221

Map Work

Objective:-

To train students in map drawing, reading and its use for geographical analysis

Course outline:

1. Maps: its elements and types
2. Principles and methods of map making, reading and reproduction
3. Scale: types and their use, grid reference and indexation,
4. Map projections: choice, construction, characteristics, and uses
5. Enlargement and reduction of maps
6. A study of the Survey of Pakistan maps
7. Physical and cultural features to be described and interpreted
8. Interpretation of weather maps of Pakistan

Field visits:

Visit to Survey of Pakistan and Pakistan Meteorological Departments.

Recommended Books:

1. Carey, H. H. (1983) How to Use Maps and Globes, Franklin Watts, New York.

Reference Books:

1. Guijan, R. & Mushtaq, R. (1974) Map Projection, Oxford University Press, Oxford.
2. Kraak, M. J. & Ormelling, F. J. (1996) Cartography: Visualization of Spatial Data Harlow, Longman.
3. Robinson, A. H. (2002) Elements of Cartography, John Willey & Sons, New York.
4. Singh. L. & Raghunaadam, S. (1964) Map work and practical Geography, kalyani publishers, New Delh

GEOG 230

Geography of Pakistan

Objective:

This course attempts to impart knowledge about the relationship between man and physical, socio-economic and cultural environment with special reference to Pakistan, including land, population, human settlements, resources and related human activities.

Course outline:

1. Introduction
2. Geo-strategic position of Pakistan
3. Location and Geographical significance
4. Geo-political Importance
5. Administrative setup
6. Land and Physical Environment:
7. Physiography
8. Climate and climatic regions o Hydrology
9. Soils and vegetation
10. The People
11. Population characteristics: structure, composition and distribution
12. Population Change
13. Urbanization
14. Economy
15. Agriculture (crops and livestock)
16. Irrigation
17. Power and mineral resources
18. Industries
19. Trade
20. Tourism
21. Transport and Communication
22. Major challenges of Pakistan
23. Water, power, security and environmental issues

Lab. Work:

Survey, data collection and presentation on different thematic maps

Field visits:

To identify various physical regions and study of at least one region's land use, urban structure, mi area, national parks, industrial areas and various rural and urban settlements and other natural resourc

Recommended Books:

1. Ahmad, K. S. (1978) Geography of Pakistan, Oxford University Press, Oxford.

References Books:

1. Burke, J. S. (1991) Pakistan the continuing search for Nationhood, Western Press Oxford, UK.
2. Davidson, A. P. & Ahmad, M. (2003) Privatization and the Crisis of Agricultural Extension: The Case Pakistan, King's Soas Studies in Development Geography, Ashgate Publishing, New Delhi.
3. Dichter, D. (1967) Geography of N-W.F.P, Oxford University Press, Oxford.
4. Hamood, A. (1972) Study of the Middle Indus Basin, San Francisco State College, San Francisco.
5. Khan, F. K. (1991) Geography of Pakistan, Oxford University Press, Karachi
6. Spate, O. H. K. (2004) India and Pakistan, Munshiram Mohoanlal Publications Pvt. Ltd., UK.
7. Tayyeb, A. (1973) A Political Geography of Pakistan, Oxford University Press. Oxford.

Objective:

To train students in different surveying techniques

Course Outline:

1. Introduction
2. Instrumental survey and records
3. Surveying using the following instruments: o Chain survey
4. Plane Table
5. Prismatic Compass
6. Determination of heights and slopes with Abney Level o Contouring by Indian Clinometer
7. Use of Dumpy level and Theodolite
8. Total station
9. Global Positioning System (GPS)

Field visits: Visit to Survey of Pakistan and other concerned departments.

Lab. Work:

Preparation of the practical note book is mandatory.

Recommended Books:

1. Carey, H. H. (1983) How to Use Maps and Globes, Franklin Watts, New York.
2. Clendinning, J. (1970) Principles of Surveying. Blackie and Sons, New Jersey.
3. Gopi, S., Kumar, S., & Madu, R. N. (2007) Advanced Surveying: Total Station, GIS and Remote Sensing. New Delhi.

Reference Books:

1. Chandra, A. M. (2006) Plane Surveying, New Age International, 2nd edition, New Delhi.
2. Duggal, S. K. (2004) Surveying: Volume-II, Tata McGraw-Hill, New Delhi.
3. El-Rabbany, A. (2006) Introduction to GPS: The global Positioning System, 2nd edition; Artech Boston.
4. Guochang, X., (2007) GPS: Theory, Algorithms and Applications, 2nd edition, Springer, New York.
5. Kaplan, (Ed.) (2006) Understanding GPS: Principles and Applications. Artech House, London.
6. Kennedy, M. (2010) The Global Positioning System in ArcGIS, Tyler and Frances Group, New York.
7. Kumar, P. (2007) Dictionary of Global Positioning System, Biotech Books, Delhi.
8. Mc Cormac, J. (2004) Surveying, New York, John Willey & Sons.
9. Roy, S. K. (2010) Fundamentals of Surveying. Ph I learning Private Limited, New Delhi.
10. Taylor, G. & Blewit, G. (2006) Intelligent Positioning: GIS-GPS Unification. John Wiley & Sons, New Jersey.

Objectives:

To study the evolution of geographic thought and concepts.

Course outline:

1. Nature of Geography

2. Evolution of Geography
3. Pre-classical and classical periods: ancient Geography
4. Medieval Geography: Muslim contributions, European contributions.
5. Modern Geography: Humboldt and Ritter, Geography from the middle of the 20th c
Dichotomies-physical and human, systematic and regional. Quantitative Revolution, Geo-info
and Ecology.
6. Established traditions: Earth science, area study, spatial organization, man-land, system analy
cartographic science.
7. Man-environment interaction themes: Environmental Determinism, Possibilism, Probabilism, C
Behaviourism, World views on man-environment relationship.
8. Development of Nomothetic traditions: facts, concepts, hypotheses and paradigms, Ideograp
Nomothetic.
9. Philosophical framework: Positivism: Pragmatism, Phenomenology
10. Evolution of modern tools and models in geography
11. Development of geography in Pakistan

Lab. Work:

Writing of assignments and construction of maps relating to geographical thought and seminar presenta

Recommended Books:

1. Creswell, T. (2013) Geographic Thought: A critical Introduction, Wiley-Blackwell, Oxford.

Reference Books:

2. Clayton, K. & Johnson, J.H. (Ed.), (1988) Aspects of Geography, Macmillan, London.
3. Dickinson, R. E. (1969) The Makers of Modern Geography, Routledge, London.
4. Dickinson & Howarth, O.J.R. (1933) The Making of Geography, The Clarendon Press, Oxford.
5. James, P. E. & Mailim G. J. (1981) All Possible Worlds, John Wiley & Sons, New York.
6. Johnston, R. J. (1983) Geography and Geographers, Edward Arnold, London.
7. Kenzer, M. S. (Ed.) (1989) On Becoming a Professional Geographer Columbus,
Merril Publishing Co., UK.
8. ayhew, S. (1986) Geography, Harmonds Worth: Penguin London.
9. Mitchel, B. (1989) Geography and Resources Analysis,
10. Tim, U. (1992) The Place of Geography, Longman, London.

GEOG 306

Principles of Cartography

Objective:

To familiarize students with map-making science and its applications.

Course outline:

1. Evolution of Cartography
2. Basic geodesy, spherical, ellipsoidal and geoidal earth, geographical and planer coordinates, pro
of the graticule and geodetic position.
3. Map projections: Major types, merits and demerits of commonly used map projections.

4. Map Datum
5. Symbolization, symbol types and graphic variables, the symbolization problems, symbolizing g features.
6. Lettering principles.
7. Mapping statistical surfaces: Thematic map, choropleth, dot map, isolines, area cartograms.
8. Principles of cartographic design, general design problems; design of map symbols. Basic procedure designing of the thematic maps such as topographic, climatic, economic, population, settlements, morphology etc.
9. Map production, form of map output, construction material, output options, composing separate proofing.
10. Introduction to Digital Cartography
11. Terrain data (Digital Elevation Model/ Digital Terrain Model)

Lab. Work:

Drawing of various thematic maps and other relevant exercises in cartography and mapping.

Recommended Books:

1. Campbell, J. B. (2010) Introduction to Remote Sensing, The Guilford Press, London.
2. Grampton, J. W. (2010) Mapping: A critical introduction to Cartography & GIS. John Wiley & Sons, York.

References Books:

3. Bygot, J. (1960) An Introduction to Map Work & Practical Geography, Tutorial Press, London.
4. Clarke, K. (2010) Getting started with Geographic Information System, Prentice Hall, New York.
5. Foresman, T. (1997) The history of Geographic Information System, Prentice Hall, New York.
6. Heywood, I. C. S. & Carver, S. (2003) An introduction to Geographic Information System, Addison Wesley Longman, New York
7. McDonald, R. & Burrough, P. (2001) Principles of Geographic Information Systems, Oxford Univ Press, Karachi.
8. Maguire, D. J. (1991) Geographic Information System. Longman, London.

GEOG 302

Geomorphology

Objectives:

To make students understand the origin and recognize different types of landform with the help of shape,

Course outline:

1. Scope and status of geomorphology
2. Introduction to geomorphic concepts/principles
3. Factors of landform development; structure, process and geological time scale
4. Endogenic Processes
5. Isostasy
6. Diastrophism
7. Continental drift
8. Plate tectonic
9. Volcanism

10. Earthquakes
11. Exogenic Processes
12. Weathering; mass wasting and their types
13. Cycle of erosion: fluvial, glacial, eolian and Karst
14. Fluvial erosional landforms, transportation mechanisms of running water; fluvial depositional landforms, types of drainage patterns and structure
15. Glacier formation, glacier as geomorphic agent: glacial erosion and depositional landforms; lacustrine and glacio-fluvial features
16. Eolian landforms: wind as geomorphic agent; eolian erosional landforms, transportation by wind; depositional landforms
17. Ground water: porosity and permeability of rocks; aquifers
18. Karst topography and associated landforms
19. Sea wave as geomorphic agent; erosional and depositional landforms
20. Soil development: factors of soil formation, physical and chemical properties of soil, soil profile, texture and structure; types of soils

Lab. Work:

Lab. work must be conducted for soil, rocks and minerals recognition where relevant material is readily available. Geomorphic profiles, existing techniques for the interpretation of landforms and geomorphology.

Field Visit: Field trips to accessible areas for in-depth geomorphic studies.

Recommended Books:

1. Burbank, D. W. & Anderson, R. S. (2011) Tectonic Geomorphology: A Frontier in Earth Science, Blackwell Science, New Jersey.
2. Charlton, R. O. (2008) Fundamentals of Geomorphology, Routledge Taylor & Francis Group, London.

Reference Books:

1. Clarke, J. I. (1958) The Study of Soils. Oxford University Press: Oxford.
2. Dury, G. H. (1960) The Face of the Earth. Penguin Books. London.
3. Hagget, R. J (2011) Fundamentals of Geomorphology, Routledge, London.
4. King, C. (1976) Techniques in Geomorphology. Edward, London.
5. Leopold, L. B., Wolman, M. G. & Miller, J. P. (1995) Fluvial Processes in Geomorphology, Dover Publications, UK.
6. Ritter, D. F., Kochel, R. C. & Miller, J. R. (2011) Process Geomorphology, McGraw-Hill, New York
7. Russels. (1959) The World of Soils, Collins Books, London.
8. Spark, B. W. (1986) Geomorphology, Longmans, London /New York. Summerfield, M. (1996) Geomorphology, Prentice Hall Inc., New York.
9. Thornbury, W. D. (2004) Principles of Geomorphology, John Wiley & Sons, London .

GEOG 303

Climatology

Objectives:

- To understand the elements and factors of climate, spatial and temporal variations in weather and climate
- To familiarise students with the major climatic regions of the world and Pakistan.

Course outline

1. Introduction.
2. Key concepts in climatology and meteorology.
3. Structure and composition of atmosphere.
4. Elements and factors of climate.
5. Insolation and Terrestrial heat budget.
6. Temperature distribution.
7. Humidity and its types; Condensation and their forms, Precipitation, formation and their types.
8. Atmospheric Pressure and global pressure belts.
9. Atmospheric Circulation: (Upper and Lower) air stability and instability, storms; Cyclones (hurricanes, typhoons) and tornadoes
10. Air masses and fronts.
11. Classification of climates; critical study of the Koppen, Miller and Thornthwaite classifications of climates.
12. Climate variability and climate change: Natural and anthropogenic, Green housegasses; global warming, acid rain, ozone layer depletion El-Niño and La-Niña, impact on precipitation distribution.
13. Climatic regions of Pakistan and their characteristics
14. Climatic data: sources, collection, analysis and presentation. Problems associated with data (spatial, temporal).

Lab. Work:

Recording and analysis of weather data, interpretation of weather maps and synoptic charts. Visit to local weather station of Pakistan Meteorological Department and hands on exercises.

Recommended Books:

1. Ackerman, S. A. (2012) Meteorology: Understanding the atmosphere, Jones & Bartlett Publishers, Canada.
2. Ahrens, C. D. (2009) Meteorology Today, Brooks/Cole CENGAGE learning, Australia.
3. Barry. R. (2009) Atmosphere, Weather and Climate, Clays St. Davis., London.

Reference Books:

1. Byers, H. R. (1991) General Climatology, Prentice Hall, New Delhi.
2. Byers, H. R. (1993) General Meteorology, McGraw-Hill, New York.
3. Graedel, T. (1995) Atmosphere, Climate and Change, Scientific American Library, New York.
4. Haurwitz, B. & Austin, J. (1944) Climatology, McGraw Hill, New York.
5. Kendrew, W. G. (1959) Climatology, University Press Oxford, Karachi.
6. Lutgens, F. K. & Edward, J. T. (2012) The atmosphere: An introduction to Meteorology, PHI learning, New Delhi.
7. Lamb, H. (1992) Climate History and the Modern World, Methun & Co. Ltd., London.
8. MacIleeven, J. F. (1991) Fundamentals of Weather and Climate, Chapman & Hall, London.
9. Miller, A. (2001) Climatology, Methuen, New York.
10. Oliver, J. (1981) Climatology: Selected Applications, Edward Arnold, USA.
11. Sellers, A. & Henderson, A. (1986) Contemporary Climatology, Longman, London.
12. Shamshad, K. M. (1988) The Meteorology of Pakistan, Royal Book Co., Karachi.
13. Shapley, H. (1960). Climatic Change, Evidence, Causes & Effects, Harvard University Press, Cambridge.
14. Thompson, R. (1997) Applied Climatology, Principles and Practice, Routledge, Canada.
15. Trenberth, K. (1992) Climate System Modelling, McGraw-Hill, New York.
16. Trewartha, G. T. (1996) Climate System Modelling, McGraw, New York.
17. Whyte, I. (1999) Climatic Change and Human Society, Arnold Division, London

I. Nature and Scope of Population Geography

- i. Historical Outline of World Population Growth.
- ii. Importance and Development of Population Geography.
- iii. Different Views and Theories.
- iv. Relations of the Subject to other Discipline.

II. World Distribution of Population

- i. Diversity of Distribution.
- ii. Factors Influencing Population Distribution Physical Factors, Cultural and Technological Factors, Temporal and Political Factors.

III. Measures of Population Distribution

- i. Advantages and Disadvantages of Arithmetic Density.
- ii. Physiological and Economic Densities of Population.
- iii. Measures of Central Tendency of Population Distribution.
- iv. Measures of Population Dispersion and Potential.

IV. Population Composition

- i. Urban and Rural Character.
- ii. Biological Characteristics.
- iii. Cultural Characteristics.

V. Components of Population Growth

- i. Patterns and Trends of Fertility.
- ii. Patterns and Trends of Mortality.
- iii. Causes and Consequences of Migration.

VI. Problems of Population Data

- i. Sources of Population Data.
- ii. Methods of Census, Vital Registration and Sample Surveys.
- iii. Major Errors and Omissions in Population Data.

VII. Population Analysis

- i. Analysis of Fertility.
- ii. Analysis of Mortality.
- iii. Analysis of Migration.

Recommended Books:

1. Matras, J, 1977. Introduction to Population: A Sociological Approach, Cliffs, Prentice Hall, Englewood.
2. Heer, D. M, 1968. Readings on Population, Cliffs Prentice Hall, Inc. Englewood.

3. Glass, D.V, 1967. Population; Politics and Movements in Europe, Frank Cass & Co. London.
4. Garnier, J. B, 1966. Geography of Population, Longman, London.
5. Zelinsky, W, 1966 A Prologue to Population Geography, Cliffs, Prentice Hall, Inc. Englewood.
6. Clarke, J.I, 1965. Population Geography, Pergamon Press Oxford.
7. Barrette, J. & Louw, M,1962. International Aspects of Overpopulation, London, Macmillan.
8. Barclay, G. W,1958. Techniques of Population Analysis, John Wiley & sons, New York.
9. Demko, G. J & Rose H. M. & Schnell, G. A,1970. Population Geography: A Reader, McGraw Hill Book Company New York.

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GEOG 310

Oceanography

Objective:

To develop a comprehension of the origin of oceans, geomorphology, circulation and resultant physical characteristics of the oceans among the students.

Course outline:

1. Introduction
2. Origin of oceans and seas: major water masses and their distribution.
3. Morphology of the ocean basins.
4. Ocean floor deposits, their characteristics and classification.
5. Temperature, salinity and density of ocean water; distribution, causes and effects
6. Oceanic circulation: waves, currents and tides, their nature, causes, effects and impact environment.
7. Special phenomena: tropical storms; Tsunami.
8. Oceanography of Arabian Sea with special reference to Exclusive Economic Zone.

Lab. Work:

Drawing features of the Ocean floor, mapping of the ocean currents, tides and associated phenomena.

Field visit:

Visit to any coastal area to study the various coastal morphological features.

Recommended Books:

1. Garrison, T. (2005) Oceanography: An invitation to Marine Sciences, Thomson Brooks/Cole, Aust
2. Murry. (2000) The Ocean, McGraw-Hill, New York.
3. Thurman, H. V. & Trujillo, A. P. (2010) Essentials of Oceanography. Prentice Hall, Canada.
4. Thurman, H. V. (2003) Introductory Oceanography. Prentice Hall, Canada

GEOG 305

Quantitative Methods in Geography

Objectives:

To train students in collection, analysis, interpretation and presentation of quantitative spatial data and enable them to organize and conduct independent research To use database software for the analysis of Spatial and Temporal data

Course outline:

1. introduction
2. Quantitative revolution and its impact on Geography

3. Parametric and non-parametric statistics
4. Nature of geographical data and measurement scales.
5. Data summarizing techniques: theory of central tendency, dispersion, and variability.
6. Time Series: graphs, growth and decline, index numbers, logarithmic scales, trends and fluct components of time series.
7. Methods of drawing trend lines for linear and exponential series scatter diagrams, standard error probability, correlation and regression.
8. Quantitative models in Geography

Lab. Work:

1. Introduction to EPI-Info SPSS E-view, MS Excel, MiniTab and other relevant software data quantitative analysis.

Recommended Books:

1. Haring, L. L. (2002) Introduction to Scientific Geographic Research, Oxford: ECB.
2. Levin, J. (2006) Elementary Statistics in Social Research, Pearson, New Delhi.

Reference Books:

1. Maguire, D. J. (1989) Computers in Geography, London: Longman.
2. Matthew, H. & Foster, I. (1991) Geographical Data. Sources, Presentation and Analysis, Oxford University Press: London.
3. Mckillup, S. & Melinda, D. D. (2010), Geostatistics Explained, Cambridge University Press, Cambri
4. Walford, N. (2011) Practical Statistics for Geographers and earth Science, Wiley- Blackwell, Singa

GEOG 311 Environmental Geography

Objective:

To impart basic environmental knowledge to the students and enhance their awareness regarding global

Introduction:-

1. Evolution of Environmental Studies in Geography
2. Comparative Advantage of Geography
3. Concept of environmental management
4. Environment and Man
5. Ecosystem
6. Resources
7. Important Cycles
8. Population explosion
9. The human impact on the environment
10. Environmental hazards
11. Types of Hazards
12. Geophysical
13. Quasi-Natural
14. Biological
15. Technological

16. Human Response Parameters
17. Risk assessment and perception
18. Adjustment to Hazards
19. Major Environmental hazards and Problems in Pakistan:
20. Floods
21. Earthquake; Tsunam
22. Cyclones
23. Landslides
24. Droughts
25. Deforestation and Desertification
26. Water-logging and Salinity
27. Soil Erosion
28. Global Warming and ozone depletion
29. Environmental Pollution
30. Waste Management
31. Control and Mitigation Measures
32. Technology
33. Awareness
34. Legislation
35. Ethics
36. Pakistan Environmental Act
37. National Conservation Strategy
38. National Environmental Quality Standard

Lab. Work:

Field visits of urban and rural areas to identify local environmental problems and documentation o

Recommended Books:

1. Arms, K. (1991) Environmental Science, Asunders College Publishing: Philadelphia.
2. Basak, A. (2009) Environmental Studies, Pearson, New Delhi.

Reference Books:

1. Botkin, D. B. & Edward A. K. (2012) Environmental Science, John Wiley & Sons. Inc., Hoboken.
2. Burton, I. R., W. Kates & Gilbert. F. W. (1978) The Environment as Hazard, Oxford University Karachi.
3. Cunningham, W. P. (2007) Environmental Science: A Global Concern, McGraw-Hill Higher Edu Boston.
4. Dasgupta, S. (Ed.) (2009) Understanding the Global Environment, Pearson Longman, New Delhi.
5. Enger, E. D. (2004) Environmental Science, McGraw-Hill Higher Education, London.
6. Freedman, B. (1998) Environmental Science: A Canadian perspective, Scarborough Prentic Canada.
7. Goude, A. (1986) The Human Impact on the Natural Environment, Basil Blackwell, Oxford.
8. Guha, R. (2000) Environmentalism: A global history, Longman, New York, pp. 69
<http://hdr.undp.org/en/>. Geographers, Washington, DC.
9. Kjellstrom, T. (1988) Health Hazards of the Environment: Measuring the Harm, World Health, pp.

10. Lackey, R. T. (2005) Economic growth and salmon recovery: an irreconcilable conflict, Fisheries 30(3): 30-32.
11. Lead, J. R. & Smith, E. (2009) Environmental and human health impacts of nanotechnology. John Wiley & Sons, New York.
12. Marsh, W. M. & John, G. (2005) Environmental Geography, John Wiley & Sons, Inc. Hoboken.
13. Raven, Peter, H. & Linda R. B. (2004) Environment, John Wiley & Sons, Inc., Hoboken.
14. Singh, L. (2010) Environmental Geography. A.P.H. Publishing Corporation.
15. Slocumbe, S. (2004) Applying an Ecosystem Approach' in B. Mitchell: Resource and Environmental
16. Stokstad, E. (2005) Taking the pulse of Earth's life support systems, Science, 308, 41 – 43

GEOG 304

Economic Geography

Objective:

To create an understanding of Spatial variations of Economic resources and activities with reference to gl

Course outline:

1. Introduction
2. Evolution of world economic systems: Medieval feudal economics, economic impacts of color
Modern world economic systems
3. Concept of natural resources and reserves
4. Human resource and its development
5. Classification of economic activities
6. Primary activities; gathering, hunting, herding, subsistence, Intensive and extensive fa
commercial grain farming, livestock farming, dairying, mixed farming, plantation farming, lum
fishing and mining
7. Green revolution and its implications
8. Secondary activities: Industrial revolution and manufacturing industries
9. Tertiary activities
10. Quaternary and Quinary activities
11. Regional inequalities, sustainable development and poverty alleviation
12. Impacts of Globalization

Lab. work:

Collection and presentation of data from Economic Survey of Pakistan, Agricultural Statistics of Pa
etc. pertaining economic activities on maps with the help of different cartographic methods.

Recommended Books:

1. Aoyama, Y., James T. M. & Susan H. (2012) Key Concepts in Economic Geography, SAGE, Singapore
2. Alnwick, H. (2012) A Geography of Commodities, Harrap, London.
3. Hartshorne, T. A. & Alexander J. W. (1988) Economic Geography, Prentice Hall, Inc. Englewood
New York.

Reference Books:

1. Jarrett, H. R. (1969) Geography of Manufacturing, MacDonald & Evans Ltd. London.
2. Jones, C. F. & Darken. (1965) Economic Geography, Macmillan New York.
3. Khan, F.K. (1998), An Introduction to Economic Geography. Oxford Publishers, Karachi.
4. Knox, P & Agnew, J. (2008), The Geography of the World Economy. , Edward Arnold, London.
5. Luckas, M. R. (1991) Economic Activity., Longman group, UK Limited.
6. Sadhukhan, S. K. (1986) Economic Geography, An Appraisal of Resources, S. Chand and Company I New Delhi.
7. Smith, J. R., Phillips, M. O. & Smith, T. S. (2013) Industrial and Commercial Geography. Hott, Rineh and Winston, New York.
8. Thoman, C. & Yeats. (1988) The Geography of Economic Activity, McGraw-Hill Book Company, New York, Inc
9. Thomes, R. S. & Hagget, R. J. (1980) Models in Geography. Harper and Row Publishers, London.
10. Truman, A. & Jhon, W. A. (1992) Economic Geography. Prentice-Hall of India.
11. Williams, T. R. (1991) Economic Geography., Longman group, New York.

GEOG 312

Research Methods

Objective:

To create awareness among students regarding basics of geographical research

Course outline:

1. Introduction Research approaches
2. Research paradigms in Geography
3. Types of research: historical research, qualitative/descriptive research, quantitative/experimental research
4. Research design; research topic, formulation and statement of a problem, research questions, hypotheses, research objectives, research plan
5. Literature review; Literature sources: Journals (types) Books, Monographs and web sources
6. Data collection, universe and sampling: primary and secondary data, sources of data
7. Selection of a sample and measuring instruments, basic considerations in sampling, size of sample, statistical
8. considerations, Sampling units and design; points, traverses, random sampling, stratified and systematic sampling
9. Field Techniques
10. Data analysis and interpretation: pre-analysis considerations,
11. Preparing data for analysis: use of the descriptive statistics and quantitative methods.
12. Data presentation
13. Research report writing; Proposal and Synopsis writing
14. Bibliography and references

Lab. Work:

Preparation of Research presentations with the help of software (end note, reference manager etc).

Recommended Books:

1. Ackerman, E. A. (1958) *Geography as a Fundamental Research Discipline*, University of Chicago Press, Chicago
2. Baker, A. R. H. & Billinge, M. (2011) *Period and Place: Research Methods in Historical Geography*, Cambridge University Press.
3. Blaxter, L., Hughes, C. & Tight, M. (2010) *How to Research*, Tata, McGraw-Hill Higher Education, Delhi.

Reference Books:

1. Borden, Kenneth, S. & Bruce B. (2011) *Research Design and Methods*, McGraw-Hill, Singapore.
2. Bridget, S. & Lewin, C. (Ed.) (2012) *Theory and Methods in social Research*, SAGE, London.
3. Cohen, L., Manion, L. & Morrison, K. (2011) *Research Methods in Education*, Routledge Taylor & Group, London.
4. Ebdon, D. (1977) *Statistics in Geography*, Basil Blackwell, Oxford.
5. Gee, W. (1950) *Social Science Research Method*, Appleton Century Crofts, Inc. New York.
6. Gomez, B. & Jones, J. P. (Ed.) (2010) *Research Methods in Geography: A Critical Introduction*, Wiley Blackwell, UK.
7. Gregory, S. (1973) *Statistical Methods and the Geographers*, Longman, London.
8. Gupta, M. & Gupta, D. (2011) *Research Methodology*, PHI learning, New Delhi.
9. Hammond, R. E. (1978) *Quantitative Techniques in Geography*, Clarendon Press, Oxford
10. Hoggart, K., Lees, L. & Davies, A. (2002) *Researching Human Geography*, Arnold Publishers, London Edition.
11. Huff, D. (1973) *How to Lie with Statistics*, Hammonds-worth, Penguin, New York.
12. Jackson, S. L. (2011) *Research Methods: A Modular approach*, Wadsworth, Australia.
13. K. & Sharp, J A. (1983) *The Management of a Student Research Project*, Gower Publishing Company
14. Keclinger, F. N. (1986) *Foundation of Behavioural Research*, CAB Publications.
15. Kumar, R. (2011) *Research Methodology*, SAGE, New Delhi.
16. Leary, Z. (2010) *The essential Guide to doing your Research Project*, SAGE, New Delhi.
17. Montello, D. & Sutton, P. (2012) *An Introduction to Scientific Research Methods in Geographical Environmental Studies*. SAGE Publications, London.
18. Norcliffe, G. B. (1977) *Inferential Statistics for Geographers*, Hutchinson, London.
19. Plate, R. S. (1959) *Field Study in American Geography*, University Press Chicago, Illinois.
20. Taylor, P. J. (1977) *Quantitative Methods in Geography*, Houghton Mifflin, Boston.
21. Walker. (1963) *The Nature of Scientific Thought*, Prentice Hall, New Jersey.

GEOG 313

Regional Concepts

Objective: This course is framed to impart knowledge of the principles underlying the division of the world into geographic regions & to transfer knowledge of the characteristics of regions at global scale.

Course Outline:

Introduction to Regional Concepts

1. Scope, Status, and the significance of the regional approach o Regional approach and its evolut
2. Criteria for dividing world into regions
3. Physical Attributes: Location, Physiography, Climate, Soils, Hydrology and Natural Vegetation
4. Economic attributes: Human Resources, Mineral and Power resources, Agriculture, I
Communication and Trade

Types of Regions

1. Physical Regions o Economic Regions o Political Regions o
Cultural Regions
2. Special Purpose Regions

Major Regions of the world

1. Distinguishing characteristics o South Asia
2. South West Asia o Far-eastern regions o Western Europe
3. Russia and Central Asia
4. North-Africa and Anglo-America Other Regions

Role of the Region in Global Development

Lab. Work:

Identification and delimitation of different types of regions on maps.

Recommended Books:

1. Bradshaw, M. & White, G. W. (2007) Contemporary World Regional Geography: Global con
local voices, McGraw-Hill Higher Education. Boston.
2. Deblij, H. J. D & Muller, P. O. (2011) The world Today: Concepts and Regions in Geography Joh
sons Inc., New York.

Reference Books:

1. Hobbs, J. (2010) Fundamentals of World Regional 2nd edition, Cole Cengage learning: Australia
2. Knox, P. L. & Marston, S. A. (2003) Places and Regions in Global Context: Human Geography,
Hall, New Jersey.
3. James. & Preston, E. (1974) One World Divided Prentice Hall, New Jersey.
4. James. & Jones. (1965) American Geography; Inventory and Prospects. Association of /
Geographers. USA
5. Singh, R. L. (2008) Fundamentals of Human Geography, Sharada Pustak Bhawan, Allahabad.
6. Swawy, M. C. K., Bhaskara, R. & Hegde, V. M. (eds.) (2008) Urban Planning and Development
Roads, BC books for Change, Bangalore.

Objective:

The course aims to equip students with an understanding of GIS, evolution and applications of spatial data.

Course outline:**Introduction:**

Definitions, key components, functional subsystem, Raster data model, vector data model, attribute Data acquisition techniques, data sources, data capturing techniques and procedures, data visualization of spatial data, layers and projections and datums.

Map design:

symbols to portray points, lines, polygons and volumes, graphic variables, visual hierarchy, Data classification graphic approach, mathematical approach.

Spatial analysis:

Neighborhood functions, network, and overlay analysis, buffering, spatial data quality: component data quality, micro level components, macro level components, usage components, sources of error accuracy and resolution and uncertainty.

GIS Applications**Lab. Work:**

Introduction to GIS Lab (hardware/ software), Raster/ Vector/ Attribute Data Display, Scanning, Digitization, coordinate based point mapping, Raster/ Vector Conversion, Data layer integration and display of different projections, Map layout, Data Classification and Thematic Mapping, Handling Topological Errors, Overlay and network analysis.

Recommended Books:

1. Aronoff, S. (2004) Geographic Information Systems, A Management Perspective WDL Public: Ottawa.
2. Burrough, P. (2002) Principles of Geographic Information Systems for Land Resources Manage Oxford University Press, Oxford
3. Bygot, J. (1960) An Introduction to Map Work & Practical Geography, Tutorial Press, London.
4. Campbell, J. B. (2002) Introduction to Remote Sensing, The Guilford Press, New York
5. Carey, H. H. (1983) How to Use Maps and Globes, Franklin Watts, New York.
6. Clarke, K. (2004) Getting started with Geographic Information System, Prentice Hall , New York.
7. Demers, M.N. (2008) Fundamentals of Geographical Information Systems. Fourth Edition. John W Sons, New Jersey.
8. Foresman, T. (1997) The history of Geographic Information System, Prentice Hall, New York.
9. Heywood, I., Cornelius, S., & Carver, S. (2011) An Introduction to Geographical Information S Fourth Edition. Prentice Hall, New Jersey.
10. Jensen, J. R. (2006) Remote Sensing of the Environment: An Earth Resource Perspective. Second Edition. Prentice Hall, New Jersey.

11. Kimerling, J., Buckley, A. R., Muehrcke, P. C., & Muehrcke, J. O. (2011) Map Use: Reading, Analysis Interpretation. Seventh Edition. ESRI Press. USA.
12. Krygier, J., & Wood, D. (2011) Making Maps: A Visual Guide to Map Design for GIS. Second Edition Guilford Press, New York.
13. Lillesand, T. M. & Kiefer, R. W. (2004) Remote Sensing and Image Interpretation, John Wiley and Sons, New Jersey.
14. Longley, P. A., Goodchild, M., Maguire, D. J. & Rhind, D. W. (2010) Geographic Information Systems Science. Third Edition. John Wiley & Sons, UK.
15. Maguire, D. J. (1991) Geographic Information System, Longman, London.
16. Mather, P. M. (2004) Computer Processing of Remotely Sensed Images, John Wiley and Sons, New Jersey.
17. McDonald, R. & Burrough, P. (2001) Principles of Geographic Information Systems, Oxford University Press, Oxford.
18. Monkhouse, F. J. & Wilkinson, H. R. (1994) Maps and Diagrams, Methuen, London

GEOG 410

Remote Sensing

Objectives

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

Course Outline:

1. Introduction
2. History and Development
3. Concepts and Foundation of Remote Sensing o Electromagnetic spectrum
4. Visible Spectrum
5. Colour Theory
6. Atmospheric Attenuation
7. Types of Remote Sensing Systems
8. Active Remote Sensing
9. Passive Remote Sensing
10. Type of Sensors
11. RBV, MSS, TM, HRV, HRPT/APT/AVHRR, MODIS (Terra and Aqua) non-imaging systems (RADAR)
12. Types of Satellites
13. Manned Satellites (Gemini, Mercury, Apollo, Space Shuttles)
14. Unmanned Satellites (Metrological, Earth Resources,
15. Telecommunication, Spy, Scientific etc.)

16. Platforms (Orbits)
17. Ground Receiving Stations (Reception of Data) o Image Processing
18. Image Classification
19. Image Interpretation
20. Image Interpretation Methods
21. Image Interpretation Elements
22. Image Interpretation Tasks
23. Image Measurements
24. Global Positioning System (GPS)
25. Applications (Hydrology, Geology, Climatology, Environmental Application, Planning, Agricultural, Forestry, Socio-economic, Health etc.)
26. Remote Sensing in Pakistan: Potential and Prospects.

Lab Work:

Interpretation of aerial photographs, various sensors data comparison, thermal infrared image interpretation, introduction to ERDAS imagine, display, geo-linking, identification of targets, field

Recommended Books:

1. Aber, J. S., Marzol, F. I., & Ries, J. (2010) Small-Format Aerial Photography: Principles, Techniques Geoscience Applications, Elsevier, Amsterdam.
2. Aronoff, S. (2004) Geographic Information Systems, A Management Perspective, WDL Publication Ottawa.
3. Bossler, J. D. (Ed.) (2010) Manual of Geospatial Science and Technology, CRC Press Taylor & Francis Group, Boca Raton.

Reference Books:

1. Burroughs, P. (2002) Principles of Geographic Information Systems for Land Resources Management Oxford University Press, Oxford.
2. Campbell, J. B. & Wynne, R. H. (2011) Introduction to Remote Sensing. Fifth Edition. Guilford Press: York.
3. Carey, H. H. (1983) How to Use Maps and Globes, Franklin Watts, New York.
4. Foresman, T. (1997) The History of Geographic Information System, Prentice Hall, New York.
5. Heywood, I., Cornelius, S. & Carver, S. (2003) An introduction to Geographic Information System, Addison Wesley Longman, New York.
6. Iliffe, J. & Lott, R. (2008) Datums and Map Projections for Remote Sensing, GIS, and Surveying. Second Edition. Whittles Publishing, UK.
7. Jensen, J. (2000) Introductory Remote Sensing: Principles and Concepts, Freeman & Co., New York.
8. Jensen, J. R. (2011) Remote Sensing of the Environment: An Earth Resource Perspective. Second Edition. Prentice Hall, New Jersey.
9. Kraak, M. J. (1996) Cartography: Visualization of Spatial Data, Longman, Harlow.
10. Lillesand, T. M., Kiefer, R. W. & Chipman, J. W. (2007) Remote Sensing and Image Interpretation. 4th Edition. Wiley, Hoboken, NJ.

- Edition. John Wiley and Sons., New Jersey.
11. Maguire, D. J. (1991) Geographic Information System, Longman, London.
 12. Mather, P. M. (2004) Computer Processing of Remotely Sensed Images, John Wiley and Sons, New Jersey.
 13. McDonald, R. & Burrough, P. (2001) Principles of Geographic Information Systems, Oxford University Press, Oxford.
 14. Reddy, M. A. (2008) Textbook of Remote Sensing and Geographical Information System. Third Edition. BS Publications, Hyderabad.
 15. Richard, J. A. & Xiuping, J. (2006) Remote Sensing Digital image Analysis, Springer, Australia.
 16. Robinson, A. N. (1979), An Introduction to the Study of Map Projections, University Press London, London.
 17. Sabins, F. F. (2007) Remote Sensing: Principles and Interpretation. Third Edition. Waveland Press, Inc. Lake Forest, Illinois.
 18. Weng, Q. (2010) Remote Sensing and GIS Integration: Theories, Methods and applications, McGraw-Hill, New York.
 19. Wolf, P., DeWitt, B. & Wilkinson, B. (2012) Elements of photogrammetry with Application in GIS. Fourth Edition. McGraw-Hill, New York.

GEOG 411 Urban Geography

- i. Origin of towns. Site and situation. Process of urbanization in the world. Urban function, economy of urban centers. Formal and functional classification of towns; towns as central place; hinterland. Urban structure-different theories; hierarchy of settlements-city size distribution, rank law of primate city; urban expansion, metropolitan decentralization, rural urban fringe-urban sociology.
- ii. Concept and principles of Planning. History of Town Planning-ancient and medieval Modern Planning urban development urban renewal neighbourhood planning.
- iii. A study of the process of urbanization in Pakistan.

Books Recommended:

1. Dickinson, R.E. 1952. City Region and Regionalism, Routledge, London.
2. Gist, N.P. & Halbert .1950. Urban Society, Thomas, Crowell Co., New York.
3. Golany, G. 1976 New Town Planning, Principles and Practices.
4. Jackson 1966 Surveys for Town Country Planning, Hutchinson University.
5. Keeble, L. 1969 Principles and Practice of Town and Country Planning, The Estate Gazette, London.
6. Mayer H.M. & Kohn C.F. 1959. Readings in Urban Geography, University of Chicago Press, Chicago.
7. Smailes, A.E. 1966 The Geography of Towns, Hutchinson and Co. London.

GEOG 412 Digital Image Processing

I- Multispectral, Thermal and Hyperspectral Scanning:

- i. Introduction
- ii. Multispectral Scanning

- iii. Thermal Scanning
- iv. Thermal Radiation Principles
- v. Interpreting Thermal Scanning Imagery
- vi. Imaging Spectrometry

II- Satellite Systems:

- i. Introduction
- ii. Geostationary Weather Satellites
- iii. Polar Orbiting Weather Satellites
- iv. Heat Capacity Mapping Missin
- v. Landsat
- vi. SPOT
- vii. Seasat
- viii. NASA Space Shuttle

III- Digital Image Processing and Image Enhancement:

- i. Introduction
- ii. Image Rectification and Restoration
- iii. Image Enhancement
- iv. Contrast Manipulation
- v. Spatial Feature Manipulation
- vi. Multi-Image Manipulation
- vii. Image Classification: Supervised and Unsupervised Classification
- viii. Classification Accuracy Assessment
- ix. Data Merging and GIS Integration
- x. Geometric Image Correction
- xi. Spectral Image Enhancement
- xii. Spatial Image Enhancement - Operations in Spatial Domain
- xiii. Spatial Image Enhancement - Operations in Frequency Domain
- xiv. Image Classification – Supervised and Unsupervised Classification
- xv. Image Classification - Object Oriented Classification

IV- Microwave Sensing:

- i. Introduction
- ii. SLAR System
- iii. Geometric Characteristics of SLAR Imagery
- iv. Interpretation of SLAR imagery
- v. ERS (Experimental Radar Remote Sensing From Space
- vi. Radarsat
- vii. Spaceborne Radar System

V- Application of Remote Sensing:

- i. Land Cover Mapping
- ii. Land use change monitoring
- iii. Urban expansion Mapping
- iv. Environmental Monitoring
- v. Cadastral Mapping

Lab Work: Advanced Image processing on MATLAB, ERDAS IMAGINE, ENVI

Books Recommended:

1. Arnold, R. H. (1997) Interpretation of Airphotos and Remotely Sensed Imagery, Prentice Hall New
2. Harris, R. (1987): Satellite Remote Sensing: An Introduction, Routledge & Kegan Paul London.
3. Lilles T. M. & Kiefer, R. W. (1994) Remote Sensing and Image Interpretation, John Wiley & Sons N
4. Lo, C. P. (1986): Applied Remote sensing, Essex Longman.
5. Muralikrishna, I. V. (1992): Remote Sensing Applications and Geographic Information Systems, T; McGraw Hill, New Delhi.

GEOG 413

Population Geography

Objectives:

To make students understand the dynamics of population characteristics; Relationship between man environment and resources. To highlight the importance of demographic data in planning and decision making.

Course outline:

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

Lab. Work:

Consultation of the Population Census of Pakistan and representation of population data on maps.

Recommended Books:

1. Ardagh, M. (2013) Textbook of Population Geography, Random Exports, New Delhi

2. Beayheu, G. J. (1966) Geography of Population. Prentice Hall, UK.
3. Beshers, J. M. (1967) Population Processes in Social System, New York.
4. Glenn, T. (1969) A Geography of Population World Pattern, John Wiley & Sons. New York & London
5. John. I. C. (1997) Population Geography, UK.
6. Majid, H. (1994) Population Geography, Anmol Publications
7. Polunin, N. (1998) Population and global security, Cambridge University Press, UK.
8. Sharma, R. K. (2007) Demography and Population problems, Atlantic Publishers, New Delhi.
9. Waren, C. R. (1967) Studies in Demography of Pakistan, Karachi.
10. William, F. H. & Meluyn, J. (1993) An Introduction to Population Geography. University Press Cambridge, UK.
11. Wrebur, Z. (1970) A Prologue to Population Geography, Prentice Hall, New Jersey.

GEOG 496

Research Project (Thesis)

Introduction

- Background
- The Problem
- Research Questions
- Hypothesis
- Objectives
- Significance
- Historical Context

Methodological Framework

- Data Sources
- Data Quality

Data Uncertainty and Limitations

- Methods
- Techniques
- Models
- Sampling
- Accuracy Assessments
- Qualitative data (Questionnaire)
- In-situ Observation (Field Records)

Review of Literature

- General
- Issue Specific
- Technique Specific

Results & Discussion

Conclusion

Suggestions/Recommendations

References

Annexure

Semester 7

Cr. Hrs. 3x5=15

Cr. Hrs.3x5=15

Five optional papers each with 3 credit hours and one compulsory paper on research methodology (i.e. submission of research proposal to be conducted in semester 8) to be studied in semester 7. Five papers from group A, B, C, D and E. will be selected, not more than one paper from these given groups. The individual faculty members of various universities shall decide about the number of courses to be taken in this semester. They shall prepare course outline for these papers or can add more topics depending on the available resources.

GEOG 420

Agricultural Geography

I- Introduction to Agricultural Geography:

- i. Introduction
- ii. Nature and Scope
- iii. The Origins and Development of Agriculture
- iv. Theoretical aspects of Geographical Location relevant to agriculture

II- Approaches to the Study of Agriculture in Geography:

- i. Introduction
- ii. Approaches: Commodity, Regional, deterministic, systematic

III- Factors Influencing Agricultural Patterns:

- i. Physical Factors: The Terrain, Climate, Soil, Water Resources
- ii. Socio-Economic Factors: Technological, Population, Cultural, Infrastructure
- iii. Land, Labour and Capital
- iv. Government and Regional Policies

IV- Models in Agricultural Geography:

- i. The Nature and Need of Models
- ii. Classification of Models
- iii. Models of agricultural activity
 - a. Economic Models
 - b. Descriptive Models

V- Agricultural Regions: Concepts and Techniques:

- i. Concept and Methodology
- ii. Techniques: Normative, Empirical, Single Element. Statistical
- iii. Methods of Agricultural Regionalization
- iv. Data Classification and Distribution
- v. Agricultural Types
- vi. Agricultural systems of the World

VI- Field Studies and Surveys:

- i. Land Use Survey: Techniques of Land use survey

- ii. Land Capability Survey
- iii. Land Suitability evaluation Survey
- iv. Land Classification

Books Recommended :

1. Bowler, I. R. (1979) Government and Agriculture: a spatial perspective Longman London.
2. Bowler, I. R. (1985) Agriculture under the Common Agricultural Policy: a geography. University Press Manchester.
3. Bowler, I. R. (1992) The industrialization of Agriculture. In Bowler I. R. (ed).
4. Briggs, D. J. & Courtney, F. M. (1989) Agriculture and Environment. Longman, Singapore.
5. Dube, R. S. (1987) Agricultural Geography: Issues and Applications, Gian Publishing House, Delhi.
6. Grigg, D. (1984) An Introduction to Agricultural Geography, Hutchinson, London.
7. Ilbery, B. W. (1985) Agricultural Geography: A social and economic analysis Oxford University Press.
8. Muntton, R. J. C. & Morgan, W. B. (1971) Agricultural Geography, Methuen & Co., Cambridge.
9. Newbury, P. A. R. (1999) Agricultural Geography, Longman London.
10. Rhind, D. & Hudson, R. (1980) Land use, Methuen and Co. London.
11. Shukla, L. (1991) Readings in Agricultural Geography, Scientific Publisher, Jaipur.
12. Singh, J. & Dhillon, S. S. (1984) Agricultural Geography, Tata McGraw-Hill, New Delhi.
13. Symons, L. (1967) Agricultural Geography, Frederick New York.

Geog 421

Conservation of Resources

- I- **Scope of the subject;** its importance, problems created by the expanding population; and technology, increasing standards of living and greater demand for space and goods thereof. I of subject to other disciplines.
- II- **Agricultural Resources:**
Agriculture and man. Types of agriculture, agricultural land use and cropping pattern. Efficiency of agriculture, problems relating to agricultural land. Agricultural regions of the world.
- III- **Animal Resources:**
Ranching and pasture, problems of overgrazing, carrying capacity of land, recent changes in r brought about by scientific agriculture feedlots and custom feeding, modern range management.
- IV- **Problems of Human Population:**
Population distribution in different ecosystems, and different societies (with different techniques of growth of population. Relationship between man, his skills and natural resources. Rural planning in developed and developing countries. Differences in interpretation of resources. Control of population size, dangers of over population.

Book Recommended :

1. Courtney, P.P. (1965) Plantation Agriculture, G. Bell, London.
2. Laut, P. (1968) Agricultural Geography, Nelson, Melbourne.
3. Leakey, C.L.A. (1977) Food Crops of the Lowland Tropics: Oxford University Press London.
4. Steila, D. (1976) The Geography of Soils Formation, Distribution and Management, Cliffs: Englewood.
5. Symons, L. (1965) Agricultural Geography, Frederic A Preager New York.
6. Tempany, H. (1958) Tropical Agriculture, Longman London.
7. Webster, C.C. (1966) Agriculture in the Tropics: Long man, London.

Note: Reading from various geographical journals shall also be suggested.

GEOG 422

Cultural Geography

I- Introduction:

- i. Definition of Culture & Cultural Geography, Scope of Cultural Geography & its relationship with other Disciplines.

II- Basic themes of cultural geography:

- i. Cultural Ecology
- ii. Cultural Diffusion
- iii. Cultural Regions/Area
- iv. Cultural Integration
- v. Cultural Landscape.

III- Cultural History:

- i. Paleolithic Age: Hunting & Gathering Culture
- ii. Neolithic Age: Agricultural World Revolution.
- iii. Industrial Revolution & Urbanization
- iv. Detailed Study of Stages of Social Cultural Change

IV- Geo-Cultural Study of the following:

- i. Religion
- ii. Language
- iii. Rural & Urban Communities

V- Study of Pakistani Culture:

- i. History, Present Patterns and Future Prospects.

VI. CURRENT ISSUES:

- i. Terrorism, Green Politics, Globalization, Human rights Revolution of Information, Gender Ge Cultural problems.

Books Recommended:

1. Carter, G.F. (1964) Man and the Land: A Cultural Geography, Halt New York.
2. Fellmann, G.G. (1995) Human Geography Landscapes of Human Activities, WCB Publishers.
3. Forde, C. D. (1963) Habitat, Economy and Society, Methuen, London.
4. Blij H.J. (2000) Human Geography, John Wiley & Sons, Inc, Canada.
5. James M. R. (1998) The Cultural Landscape An Introduction to Human Geography, Merrill Publish
6. James, P. E. (1964) One World Divided, Blaisdel Publishing Co., New York
7. Johnston, R.J. et al(1996) Geographies of Global Change, Blackwell Publishers Inc.
8. Leighly, J. (1965) Land and Life, Barkley; University of California Press.
9. Saucer, C. O. (1952) Agricultural Origins and Dispersal, American Geographical Society New York.
10. Quddus S. A. (1989) The Cultural Patterns of Pakistan, Ferozesons (Pvt.) Ltd., Lahore.
11. Terry G. J. Lester R. (2000). Human Mosaic, Harper Collins Publishers, New York.
12. Wagner, (1959). Readings in Cultural Geography, University of Chicago Press Chicago.
13. Wheeler, M. (1962). Indus Civilization University Press Cambridge.
14. White, L. A. (1959). Evolution of Culture, McGraw Hill New York.

GEOG 424

Geography of Manufacturing

I- Introduction to Geography of Manufacturing:

- i. Definitions and concepts, and organization.
- ii. Classification of industrial activities.

Historical Development of Industrial Activity:

- i. From industrial revolution to green paradigm.
- ii. Modern trends in manufacturing.

iii- Industrial Location:

- i. Approaches to location dynamics.
- ii. Location factors.
- iii. Location models.
- iv. Location theories.

IV- Geographical Analysis of Selected Industries:

- i. Light industries (Cotton textiles, sugar industry)
- ii. Heavy industries (Iron and steel, petro-chemicals, cement)

V- Modern Issues in Manufacturing:

- i. Patterns of international production and the industrialization process.
- ii. De industrialization.
- iii. Industry and environmental problems.
- iv. industrial planning and management.

Recommended Books :

1. Alexanderson, G. (1967) Geography of Manufacturing, Prentice Hall, Publications Englewood Cliffs.
2. Altaf, Z. (1988) Entrepreneurship in the Third World Risk and Uncertainty in Industry in Pakistan, Croom Helm, Ltd. London.
3. Aziz, S. (1969) Industrial Location Policy in Pakistan, 1st edition; National Publishing House Ltd. Kara
4. Chapman, K. & Walker, D.F. (1991) Industrial Location, 2nd edition; Wiley Eastern Ltd. Oxford.
5. Emery, J.S. & Shaw, J.H. (1968) Cities and Industries, Milton, 1st edition; Jacaranda Press.
6. Hayter, R. (1962) The Dynamics of Industrial Location, John Wiley & Sons New York.
7. Miller, E.W (1962) A Geography of Manufacturing, Prentice Hall Publications Englewood Cliffs.
8. Smith & Phillips (1961) Industrial and Commercial Geography, 4th edition; Constable & Company, L
9. Smith, D.M. (1981) Industrial Location, 2nd edition, John Wiley & Sons New York.
10. United Nations (1962) Industrial Districts – The Physical Planning of Industrial Estates, Department of Economic and Social Affairs New York.
11. United Nations (1966) Industrial Estates: Policies, Plans and Progress, Department of Economic and Social Affairs New York.
12. Watts, H.D. (1987) Industrial Geography, 1st edition, Longman Scientific and Technical London

GEOG 425

Hydro Geography

I- Introduction:

- i. Definition and Scope
- ii. Development of Hydro Geography
- iii. Muslim's Contribution

II- Hydrological Cycle and Water Balance:

- i. Water Reservoirs
- ii. Hydrological Cycle
- iii. Water Balance

III- Precipitation and Rainfall:

- i. Forms of Precipitation
- ii. Rainfall Data and its measurement
- iii. Evaporation and Transpiration
- iv. Synoptic Meteorology of Rain
- v. Space time Characteristics of Rainfall
- vi. Statistical Analysis and Cartographic Representation of Rain Fall Data
- vii. Geographical Distribution of Rainfall

IV- Runoff:

- i. Factor affecting the Runoff

- ii. Runoff Cycle and Phases of Runoff
- iii. Measurement of Runoff
- V- **Ground Water:**
 - i. Occurrence Origin and Discharge of Ground Water
 - ii. Ground Water Reservoirs
 - iii. Water Table Water Logging and Salinity
 - iv. Porosity Permeability and Transmission
 - v. Ground Water Movement
- VI- **Floods:**
 - i. Causes and Seasonal Distribution of Floods
 - ii. Flood Protection and Planning
 - iii. Geographical Distribution of Floods
- VII- **Glacial Water:**
 - i. Glacial Nourishment and Wastage
 - ii. Glacial Runoff
 - iii. Glacial Flow
 - iv. Response of Glacier to Climatic Changes
- VIII- **Droughts:**
 - i. Extent and Distribution of Droughts
 - ii. Drought Severity, Frequency and Duration
 - iii. Hydrological Relations in Droughts
- IX- **Lakes:**
 - i. Origin and Diversity
 - ii. Hydrological Cycle and Water Balance Lakes
 - iii. Geographical Distribution
- X- **Water Pollution:**
 - i. Classification of Water Pollutants
 - ii. Extent and Distribution of Water Pollutants
 - iii. Effects of Water Pollution on Fauna and Flora
- XI- **Quantitative Hydro Geography:**
 - i. Basis Concepts
 - ii. Areal Aspects of Drainage Basins
- XII- **GIS and RS Application:**
 - i. RS-based Hydrological Data Acquisition
 - ii. GIS-based Hydrological Mapping

Books Recommended :

1. Aronoff, S. (1995) Geographic Information Systems: A Management Perspective, Wdl Publication: Ottawa, forth edition Canada.
2. Chow, V. T. (1964) A Handbook of Applied Hydrology, McGraw Hill New York.
3. Drwry S.A. 1990 A Guide to Remote Sensing and Image Processing, Press Oxford.

4. Hill, E.S. (1966) Arid Lands, Methuen London.
5. Hutchinson, G.E. (1960). A Treatise on Limnology, Chapman Hall Ltd. London.
6. John. R.J. (1996) Introduction to Digital Image Processing. Prentice Hall.
7. Meinzer, O.E. (1942) Hydrology, McGraw Hill New York.
8. Curran P. J. (1985) Principles of Remote Sensing. Longman Group Ltd.
9. Steel, E.W. (1966) Water Supply and Sewerage (4th ed.) McGraw Hill New York.
10. Strahler, A.N. (1963) The Earth Sciences, Harper & Row New York.
11. Lillesand T. M. & Kiefer R. W. (2004) Remote sensing and image interpretation. John Wiley & Son
12. Todd, D.E. (1959) Ground water, John Wiley New York.
13. Tolm, C.F. Ground water, McGraw Hill New York.
14. Wisner, C.O. (1959) Hydrology, John Wiley New York.

GEOG 426

Medical Geography

I- Introduction to Medical Geography:

- i. Definitions, themes, concepts, Nature & scope of Medical Geography
- ii. The Historical Development of Medical Geography
- iii. The status of Medical Geography.

II- Factors inflecting the Patterns of Health & Disease:

- i. Geographical Factors.
- ii. Physical Factors / Environmental Factors.
- iii. Cultural Factors.
- iv. Socio – Economic & Political Factors.

III- Patterns & Processes of Health & Disease:

- i. Spatial variations in health & welfare patterns.
- ii. Role of Geography in exploring the impacts of diseases.
- iii. Models in Medical Geography
 - a. Epidemiological Transition
 - b. Health & inequalities
 - c. Inverse care law.
- iv. Global Patterns of health & Disease.
- v. Global Eradication of disease.

IV- Progress in Medical Geography:

- i. Recent Issues & Developments in Medical Geography.
- ii. GIS, Remote Sensing & Health studies.
- iii. Changing Societies & future Health care.
- iv. Geography, Health care & Planning.

Recommended Books :

1. Izhar, F. (2004) Geography & Health: A study in medical Geography, A.P.H. Publishing corporation Delhi.
2. Leninan, J.& Fletcher, W.W. (1976) Health & the Environment, 1st edition, Blacker & Sons Ltd. Gla:
3. Lloyd, J. (2002) Health & welfare, Holder & Stoughton London.

GOEG 427

Pleistocene Geomorphology

- I- Pleistocene period in general. Major characteristics of climate and landforms. Glacial, inter-glacial
- II- Pleistocene of Pakistan. Major glacial and Periglacial zones. Climate and geomorphological processes and material produced.
- III- Landforms and their characteristics in relation of lithology.
- IV- Chronology of landform development. Problems of boulder conglomerate and loess. Correlation: Potwar and Himalayas etc.
- V- Pleistocene approach and advent of man and human culture, major areas of settlement and associated problems. Deforestation, erosion and bad land topography. National problem of land utilization.

Books Recommended :

- i. Embleton C & King C.A.M. (1968)-Glacial & Periglacial Geomorphology, Edward Arnold, John Wiley York
- ii. Flint R.F. (1957) Glacial & Pleistocene Geology, N.Y., John Wiley.
- iii. Patterson (1962). Soan the Paleolith of Pakistan, GOP, Lahore

GOEG 428

Political Geography

- I- Nature and objectives of Political Geography, Definition and development of political geography thought.

II- A critical examination of the following:

- i. Concept of environmental relationship in political geography.
- ii. The concept of geopolitics its development and short-comings (special reference may be made to the views of Karl Ritter, Friedrich Ratzel, Rudolf Kjellen, Vidal de la Blache, Jean Brunhes, Thayer Mahan, Sir Halford MacKinder, Karl Haushofer, Nicholas J. Spykman and Alexander Surversky).
- iii. National deterministic theories of Germans and French possibilities.

III- State as a Politico-geographic Phenomenon:

- i. Concept of the state and its classification. Chief political-geographic characteristics of states.
- ii. Hierarchy of political area.
- iii. Frontiers and boundaries: their concepts, functions and classification.
- iv. Core areas, ecumenical area and capitals.

IV- Approaches and forces in the politico geographic study of state:

- i. A critical examination of the following approaches:
 - a. Simple descriptive approach.
 - b. Historical approach.
 - c. Morphological approach.
 - d. Functional approach.
 - ii. Forces affecting the internal functioning of a state:
 - a. Centrifugal forces.
 - b. Integrating factors.
 - iii. Factors affecting the external relations of a state:
 - a. Territorial considerations.
 - b. Economics factors.
 - c. Political relations.
 - d. Strategic consideration.
 - e. Ideological and cultural factors.
- V- A study of the foreign relations of the following states in relation to the above factors:
- i. U.S.A.
 - ii. U.K
 - iii. Russia
 - iv. China
- VI- A detailed political geographical study of Pakistan
- VII- World Organization:
- i. United Nations.
 - ii. Analysis of the World Political Patterns in terms of their economic, strategic, ideological and relationships with special consideration of British Commonwealth, European Common North Atlantic Treaty organization, South East Asia Treaty Organization Central Treaty Orga and the Arab League.

Books Recommended :

- i. Alexander D. M. (1963) World Political Patterns, Rand McMally, Chicago.
- ii. Blij, H.J.(1967) Systematic Political Geography, John Wiley New York.
- iii. Bowman, I. (1928) The New World Problems in Political Geography, Ginn New York.
- iv. Cohen, S. B. (1975) Geography and Politics in World Divided, Random House New York.
- v. G. Y.M. (1956) Political Geography and the World Map, Fredrick A. Praeger New York.
- vi. Saul, R (1963) Politics in Southern Asia, Macmillan London.

GEOG 429

Regional Planning & Development

Principles and Scope of Planning and Development:

- i. Planning: A Geographer's View.
- ii. Planning Processes.
- iii. Planning as an Activity.
- iv. Objectives in Planning.
- v. Objectives of Regional Development Efforts.

II- Implications of Regional Development:

- i. Defining Regions.
- ii. Regional Hierarchy and Classification.
- iii. Regionalism or Administrative Boundaries?
- iv. Determining Regional Boundaries.
- v. Factors contributing to Uniformities and Disparities in Regions
- vi. Types of Development Regions.
- vii. The Problem of Regional Growth.
- viii. Locational Theory and Regional Growth
- ix. Criteria for the Choice of Regional Projects.

III- Resources and Planning:

- i. The Resource Base.
- ii. Resource Evaluation.
- iii. Utilization of Resources for Planning and Development.

IV- Urban and Regional Planning:

- i. Urban Growth Patterns.
- ii. Impact of Industrialization.
- iii. Phenomenon of Urban Spread.
- iv. Planning for Cities and City Regions.

V- Rural Planning:

- i. Agricultural Planning and Rural Development.
- ii. The Human Factor in Agricultural Development.
- iii. Agrovilles and New Rural Settlements.

VI- Examples of Urban/Rural/Regional Planning with Special Reference to Pakistan:

- i. Las-Bela Mekran Region
- ii. Kulu Region.
- iii. Multan-Bahawalpur Region
- iv. Sargodha Region.
- v. Barani Region.

VII- Students shall be required to chose a region and develop conceptual hierarchy and planning models for the region. The report shall accompany all regional data with a master regional plan

Books Recommended :

- i. Birmingham, W., & Ford, A.G., (1966) Planning and Growth in Rich and Poor Countries, George Allen & Unwin Ltd., London.
- ii. Cox, K. R. (1979) Location and Public Problems, Basil Black-Well, Oxford.
- iii. Frey H. (1999) Designing the city towards a more sustainable Urban Form, Routledge London.
- iv. Goodall, B. & Kirby, A, (1979), Resources and Planning Pergamon Press, Ltd., Oxford.
- v. Hall P. (1989) Urban and Regional Planning, 2nd edition Allen & Unwin London.
- vi. Hancock J. (1978) Urban Development & Planning, Basil Blackwell Publisher London.

- vii. Hudson R. & Lewis J.R. (1982) Regional Planning in Europe, Pion Ltd. London.
- viii. Keeble, L. (1969) Principles & Practice of Town & country Planning, The Estate Gazette Ltd. London
- ix. Mc Loughlin, B.J. (1969) Urban and Regional Planning: A System Approach, Faber and Faber, London
- x. Weitz, R. (1965) (general editor) Rural Planning in Developing Countries, Routledge and Kegan Paul

GEOG 430

Settlement Geography

Objectives:

To explain the process of formation and development of human settlements To enable students to develop understanding regarding the processes of urbanization.

Course outline:

1. Introduction
2. Significance of settlement geography, basic definitions: Site and situation, hierarchy and types of settlements
3. Rural settlements: Dispersed settlements, nucleated and ribbon settlements; their contrasts between More Developed Countries (MDCs) and Less Developed Countries (LDCs)
4. Forms and patterns of settlements, house types and their evolution in rural areas
5. Commercial functions of rural settlements and their role as a market town
6. Infrastructure and services in rural settlements.
7. Historical evolution of urban settlements, western and non-western urbanization, rural-urban suburbs and satellites
8. Economic base, urban function and functional classification
9. Towns and villages as central places
10. Internal structure of the cities and land use pattern
11. Theories of urban structure: Concentric Zone theory, Sector theory, Multiple Nuclei theory, and area analysis,
12. Urban development: slums and blighted areas.
13. City-size, distribution, rank-size rule, primate city

Lab. Work:

Analysis of settlement types from topographic sheets, their centrality as population foci, urban areas etc

Field Visit:

Field trips to study land use of major cities in Pakistan.

Recommended Books:

1. Chisholm, M. (1982) Rural Settlements and Land use. Hutchinson University Library, London.
2. Gerald, B. (1966) Urbanization in Newly Developing Countries, Prentice Hall, London.
3. Gottdiener, M. & Budd, L. (2005) Key concepts in Urban Studies. SAGE Publications, London.
4. Gupta, K. R. (2004) Urban Development debates in the new Millennium, Vol.4, Atlantic Publishers: Delhi.
5. Hall, T. & Barrett, H. (2012) Urban Geography, Routledge, Taylor & Francis Group, London.
6. Hudson, F. S. (1970) Geography of Settlement. Macdonald & Evans, London.
7. Knapp, B. (1986) Systematic Geography, Allen & Unwin, London.

8. Larice, M. (Ed.) (2013) The Urban Design Reader, Routledge, Taylor & Francis Group, London.
9. LeGates, R.T. (Ed.) (2011) The city Reader, Routledge Taylor and Francis Group, London.
10. Lewis, C. P., Mitchel, F. & Dyer, C. (2001) Village, Hamlet and Field: Changing Medieval Settlements in Central England. Windgather Press, England.
11. Macionis, J. J. & Parrillo, V. N. (2011) Cities and Urban life, PHI learning, New Delhi.
12. Mayer, H. M. & Kohn, C. F. (1959) Readings in Urban Geography, University of Chicago Press, USA
13. Michael, P. (2002) Urban Geography. A global prospective, Rutledge, New York.
14. Murphy, R. E. (1966) The American City: An Urban Geography. McGraw Hill, New York.
15. Neuwirth, R. (2004) Shadow Cities: A Billion Squatters, A New Urban World, Rutledge, New York.
16. Pacione, M. (2009) Urban Geography-A Global Perspective. Third Edition. Routledge, London
17. Rennie, J. & Short, P. (1992) Human Settlement (Illustrated Encyclopaedia of World Geography, University Press, Oxford.
18. Robert, B. K. (1996) Landscapes of Settlements: Prehistory to Present, Rutledge, London

GEOG 431

Tourism Geography

I- Introduction to Tourism Geography:

- i. Definitions, themes, concepts, nature and scope of tourism geography.
- ii. The Historical Development of the Geography of Tourism and Recreation.
- iii. The status of Tourism Geography.

II- Modern Tourism and Recreation:

- i. The demand for Tourism and Recreation.
- ii. The supply for Tourism and Recreation.
- iii. The impact of Tourism and Recreation.
 - a. Socio-Economic Impacts.
 - b. Physical-Environmental Impacts.

III- Resources and Tourism:

- i. Trends and themes in the use of tourism resources.
- ii. Natures as recreational resource.
 - a. Urban tourism.
 - b. Rural tourism.
 - c. Coastal and resort tourism.

IV- The Tourism Geography of World:

- i. Patterns and processes of world tourism.
- ii. Factors influencing tourism.
- iii. Tourism & recreation in Pakistan.

V- Tourism and Recreation Planning and Policy:

- i. Planning and management of tourism and recreation.

- ii. Principles processes and planning models.
- iii. Approaches to tourism planning.
- iv. Assessment and monitoring.
- v. Tourism policy initiatives and decision-making.
- vi. Sustainable development and tourism geography.

Recommended Books :

- i. Brunt, P. & Page, S.J. (2001) *Tourism an Modern Synthesis*, 1st edition; Thomson learning London
- ii. Davidson, R. & Maitland, R. (1997) *Tourism Destinations*, 1st edition; Hodder and Stoughton Lond
- iii. Hall, C.M. & Page, S.J. (1999) *The Geography of Tourism and Recreation*, 1st edition; Routledge Lc
- iv. Herbert, D. (1995) *Heritage, Tourism and Society*, 1st edition, Mansell Publishing Ltd. London.
- v. Hudman, L. & Jackson, R. (1998) *Geography of Travel and Tourism*, 3rd edition Delmar Publishers
- vi. Jafari, J. (2000) *Encyclopedia of Tourism*, 1st edition, Routledge London.

GEOG 432

Transportation Geography

I- Basic concepts of Transportation Geography:

- i. Definition, Growth and Scope of Transportation Geography.
- ii. Theory of Transportation.

II- Spatial Variations in Transportation Costs:

- i. Location of Transportation Routes and Networks
- ii. The Structure of Transportation Costs.
- iii. Transportation Costs and the Location of Economic Activity.
- iv. Transportation Improvements and their Spatial Impact.

III- Transportation Network Analysis: (Study & application of the following)

- i. Aggregate Measures :
 - a. Graph Theoretic Concepts: Non-Ratio Measures, (cyclomatic Number, Diameter), Ratio Measures (Alpha, Beta, Gamma, Eta, Pi, Theta, Jota).
 - b. Measures of Individual Elements of Transportation Net-work: Associated Number, conner Dispersion, Accessibility, and circuitry.
 - c. Measures of Nodal Accessibility:
 - i. Nodal Accessibility.
 - ii. The Shortest Path Matrix
 - iii. Network as Valued Graph
 - iv. Graph Theory Interpretation of Hierarchies.

IV- Linkage Importance in a Regional Highway Network:

V- Design and Performance of Network:

- i. Costs and Benefits in Path Design.

- ii. Traveling Salesman Problem.
- iii. Other Minimum Distance Networks.
- iv. The Best Path in a Network.

VI- The Best Path on Irregular Surfaces:

VII- Other Irregular Surfaces and Isochrones:

VIII- Flow Analysis:

- i. Concepts and Methods in Flow Analysis.
- ii. Gravity Model :
 - a. Basic Gravity Model.
 - b. Gravity Model and Traffic
 - c. Gravity Model and Hinterland Analysis.
 - d. Gravity Model and Potential Maps.
 - e. Jilman's Triade.
 - f. Weakness of the Gravity Model.

IX- Model Systems:

- i. Characteristics and Comparison of the following Model System :
 - a. Rail Road.
 - b. Motor Transport.
 - c. Water Ways.
 - d. Air Transport.
 - e. Pipe Lines.

Transportation Planning in Developing Countries:

- i. The Need for Comprehensive Planning & Analysis
 - 1. System Approach.
 - 2. Comprehensive Planning.
 - 3. Pricing Policies.
- ii. Transport-Alternatives Evaluation Model :
 - a. Regional Consumption, Incomes, Prices.
 - b. Aggregate Demand, Production and Growth.
 - c. Input-Output Relationship.
 - d. Investment and Capacity.
 - e. Transportation Sector.

Books Recommended:

- iii. Cole & King, (1968) Quantitative Geography, John Wiley & Sons, London.
- iv. Edward J. Taafee, (1996) Geography of Transportation, Prentice Hall , New Jersey.
- v. Haggette, P. A.D. (1965) Locational Analysis in Human Geography Edward Arnold, London.
- vi. Michael E. Eliot H. ed. (1974) Transportation Geography, McGraw Hill , New York.
- vii. Ronald, (1971) Gould, Spatial Organization, Prentice Hall, New Jersey.

THE BASES OF COMMUNITY HEALTH**Health: Involvement of the Community**

- Defining health: physical, social, mental, spiritual health
- Historical perspective
- Models of health
- Concept of community
- Primary health care and health for all
- Millennium Development Goals and health
- Health through health promotion and disease prevention
- Indicators of health status/measuring health
- Health status/ issues and causes of death in developed and developing countries

Epidemiology: Assessing the Health Status of Population

- Definition of epidemiology
- Triad model of epidemiology
- Measurement used in epidemiology
- Sources of health data
- Research studies in epidemiology; types

ORGANIZATION OF COMMUNITY HEALTH**I. Health Organizations at World Regional and Local Levels**

WHO, UN, UNICEF and others Public health service Provision of health care services

International Health: Health issues of the world and its changing nature

Ministry of health and health department (Pakistan)

II. The Private Sector

Role of private sector in community health

Philanthropic and religious organizations

ISSUES OF HEALTH CARE**III. The High Cost of Health Care**

Health care costs: problem and issues

Factors responsible high health care costs

Accessibility and affordability of health care services

IV. Quality of Health Care

Definition and measurement of quality of health care

Assessing the quality of care according the need of population

V. Disease Control: Communicable Diseases

Disease organisms

Immunity and natural defense system in human body

Respiratory diseases

Gastrointestinal diseases

Sexually transmitted diseases and HIV/AIDS

Malaria and other diseases

VI. Chronic diseases

Chronic diseases (definition) / COPD

Old age and health problems

Cardiovascular diseases

Cancers

Diabetes and related issues

Other disorders

Chronic diseases and community health

VII. Environment and Health

Safe water

Pollution (air, water, noise) and health issues

Disposal of solid waste

Industrial waste

Hospital waste

Radiation and other issues

GEOGRAPHIC DISTRIBUTION OF HEALTH PROBLEMS

The Urban Community and health issues

Rural Community and Health issues

Recommended Books:

1. Izhar, F. 2004. Geography & Health: A study in medical Geography, A.P.H. Publishing corporation New Delhi.
2. Leninan, J.& Fletcher, W.W. 1976. Health & the Environment, 1st edition, Blacker & Sons Ltd. Glasgow
3. Lloyd, J. 2002 Health & welfare, Holder & Stoughton London.

Field Survey Report

The students shall carry out field survey on any one of the following fields:

- GEOG. 493. Demographic Survey
- GEOG. 494. Hydrological Survey
- GEOG. 495. Industrial Survey
- GEOG. 496. Land Use Survey
- GEOG. 497. Landforms Survey
- GEOG. 498. Soil Survey
- GEOG. 499. Urban Survey

Each student shall be required to collect data/information pertaining to his/her topic in a selected area/region, tabulate the data and write report on it.

GEOG 500: Thesis

(In lieu of two optional papers in semester VIII)

Curriculum for BS Geography
Allied courses
Department of Earth Sciences
University of Sargodha,
Sargodha.

ENG-101:

ENGLISH- I

Course Aims:

The aim of this course is to groom the students linguistically in such a manner that they can read and understand different texts written in English (academic or non academic) by applying different strategies of reading. A particular care has been taken to gratify the aesthetic needs of the learners. The basic aim of this course is to develop reading and critical thinking among the students. This course also aims to train students to meet the demands of subjects written in the English language which need to be dealt with at optimal level of efficiency. The course will enable the learners to develop vocabulary in English by reading dynamic texts and understand different communication patterns in the English language.

1: An introduction to:

- a: Language .
- b: Communication.
- c: Grammar.

2: Sentence:

Definition, Parts: Subject, Predicate, Phrase, Clause,
Types---simple, compound, complex, multiple, declarative,
Interrogative, Imperative, Exclamatory, Optative.

3: Parts of Speech:

Noun, Pronoun, Adjective, Verb, Adverb,
Preposition, Conjunction, Interjection.
Error Analysis.

4: Tenses: Active Voice & Passive Voice.

5: Clause Analysis & Synthesis.

6: Use of Dictionary & Vocabulary Building.

Poems:

- | | | |
|----|-------------------------------|-------------------|
| 1: | New Year Resolutions | Elizabeth Sewell |
| 2: | Tartary | Walter De La Mare |
| 3: | The Huntsman | Edward Lowbury |
| 4: | The Character of A Happy Life | Sir Henry Wotton |
| 5: | One Art | Elizabeth Bishop |
| 6: | Death The Leveller | James Shirley |

Short Stories:

- | | | |
|----|------------------------------|------------------|
| 1: | The Duchess and the Jeweller | Virginia Woolf |
| 2: | The Voice | S.V. Pritchett |
| 3: | Passion in the Desert | Honore De Balzac |

Essays:

- | | | |
|----|---------------------------|-------------------|
| 1: | Spoon Feeding | W.R. Inge |
| 2: | Nagasaki, August 9, 1945. | Michaito Ichimaru |
| 3: | My Tailor | Stephen Leacock |
| 4: | The Damned Human Race | Mark Twain |

Recommended Books:

1. Burns & McNamara, (1987). Literature, A Close Study. McMillan
2. Burton, S.H, (1984). Mastering English Language. McMillan.
3. Devitiis, Mariani & O'Malley, (1991). English Grammar for Communication. Longman.
4. Gill, G, (1985). Mastering English Literature. McMillan.
5. Guddon, J.A, (1991). Dictionary of Literary Terms and Literary Theory. Penguin.

ENG-102:

ENGLISH-II

Course Aims:

The aim of this course is to groom the students linguistically in such a manner that they can read and understand different texts written in English (academic or non academic) by applying different strategies of reading. A particular emphasis has been taken to gratify the aesthetic needs of the learners. The basic aim of this course is to develop critical and critical thinking among the students. This course also aims to train students to meet the demands of other subjects written in the English language which need to be dealt with at optimal level of efficiency. The course shall enable learners to develop vocabulary in English by reading dynamic texts and understand different composition patterns in English language.

- Narration
- Punctuation
- Note-Taking
- Oral Presentation Skills
- Paragraph Writing

Poems:

- | | | |
|----|---|--------------------|
| 1: | The Divine Image | William Blake |
| 2: | Sonnet Composed Upon Westminster Bridge | William Wordsworth |
| 3: | Youth and Age | S.T. Coleridge |
| 4: | To Wordsworth | P.B. Shelley |
| 5: | Patriot into Traitor | Robert Browning |
| 6: | When You Are Old | W. B. Yeats. |

Short Stories:

- | | | |
|----|----------------------|----------------|
| 1. | Mayhew | S. Maugham |
| 2. | The New Constitution | S. H. Manto |
| 3. | Breakfast | John Steinbeck |

One Act Plays:

1. The Bear
2. Smoke Screens

Anton Chekhov
Harold Brighouse

Essays:

1. Quid-e-Azam's Address to the Constituent Assembly.
2. Seeing Life
3. The Last Lesson

Arnold Bennet
Alphonse Daude

Recommended Books:

1. Burns & McNamara , (1987). Literature. A Close Study. McMillan.
2. Burton, S. H, (1984). Mastering English Language. McMillan.
3. Devitiis, Mariani & O'Malley , (1991). English Grammar for Communication. Longman.
4. Gill, G, (1985). Mastering English Literature. McMillan.
5. Guddon, J.A, (1991). Dictionary of Literary Terms and Literary Theory. Penguin.

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باب اول: مطالعہ قرآن و حدیث

باب دوم: مطالعہ سیرت

باب سوم: مطالعہ تہذیب و تمدن

باب اول: مطالعہ قرآن و حدیث (Critical Study of Quran & Hadith)

مشروعات

انہ حید (واللہ کا نطق فی مطالعہ تفسیر و تدبر)

آیات

اللہ ما فی السموات وما فی الارض وان قد اصابنی الف حکم او سخطوہ یدہ ما سبکم بہ اللہ فخطب لیس یذکر و یعدیب من یراہ و اللہ علی کثر من فانی (البقرہ: ۲۸۵)

انکم ترؤا ان اللہ سخر لکم ما فی السموات وما فی الارض واسع علیکم و بینه ظاہر تو باطن و من الناس من یذکر فی اللہ بقرہ و یروا دینی ولا کتاب غیرہ (القمان: ۲۰)

ایسا لانہ احسان ان نسبتہ و الخطا مارا لا تحملہ بنا اسما کما حماتہ علی الذین من قبلہ و بنا انہ صابنا و انہ یفعل ما یشاء و اللہ عالم الغیوب و اللہ غفور رحیم (نور: ۳۸۴)

انہ سخر یوم ایلانہ فی الاقصر و فی التوسیم حی تبس لہم ان الحق انہم یکنف برکت الہی انہم یبیدو الایات انہم یروا

انہ فی خلق السموات و الارض و اختلاف قبیل و الیہ و است انہم یروا انہم یبیدو الایات انہم یروا

انہ الذین یذکرون اللہ فیما رزقہم و انہم یذکرون فی خلق السموات و الارض و انہم یذکرون انہم یبیدو الایات انہم یروا

انہ الذین یذکرون اللہ فیما رزقہم و انہم یذکرون فی خلق السموات و الارض و انہم یذکرون انہم یبیدو الایات انہم یروا

انہ الذین

انہ الذین یذکرون اللہ فیما رزقہم و انہم یذکرون فی خلق السموات و الارض و انہم یذکرون انہم یبیدو الایات انہم یروا

رسالت (البانی کتب و ما لکے پڑھانے آویں نبوی، ایضاً بت رسول اور تم نبوت)

انہ الذین

انہ الذین یذکرون اللہ فیما رزقہم و انہم یذکرون فی خلق السموات و الارض و انہم یذکرون انہم یبیدو الایات انہم یروا

انہ الذین یذکرون اللہ فیما رزقہم و انہم یذکرون فی خلق السموات و الارض و انہم یذکرون انہم یبیدو الایات انہم یروا

انہ الذین یذکرون اللہ فیما رزقہم و انہم یذکرون فی خلق السموات و الارض و انہم یذکرون انہم یبیدو الایات انہم یروا

٢. يا ايها الذين امنوا لا ترفعوا اصواتكم فوق صوت النبي ولا تجهروا له بالقول كجهر به ومنكم من يظن ان يحبط اعمالكم و انهم لا يسمعون شيئا
(الحجرات: ٢)

٣. ان الذين يفتنون اصواتهم عند رسول الله او تلك الذين امنوا الله قلبهم للايقون لهم مغفرة وا اجر عظيم (الحجرات: ٣)

٤. و انهم صبروا حتى تخرج اليهم لكان خيرا لهم والله غفور رحيم (الحجرات: ٤)

٥. ان الذين يتنادونك من وراء الحجرات اكثر هم لا يعقلون (الحجرات: ٥)

٦. يا ايها الذين امنوا ان جاءكم فاسق بنبأ فتبينوا ان تصيروا قوما بجهالة فتصبحوا على ما فعلتم نادمين (الحجرات: ٦)

٧. و انما ان فيكم رسول الله لو يطيعكم في كثير من الامر نعمت ولكن الله يحب اليتم الايمان و يريه في قلوبكم و كرهه اليكم
الكفر و الفسوق و العصيان اولئك هم الراضون (الحجرات: ٧)

٨. فضلا من الله و نعمة و الله عليم حكيم (الحجرات: ٨)

٩. اني ارسلت بالاسموسميين من انفسهم و ازواجه امهتهم و اولو الارحام بعضهم اولي بري حتى في كتاب الله من المؤمنين المهاجرين الذين
تبعوا النبي اولياء كما معروفاء كان ذلك في الكتاب مسطورا (الاحزاب: ٦)

١٠. ان الله و ملائكته يصلون على النبي يا ايها الذين امنوا صابروا عليه و سادوا تسليما (الاحزاب: ٥٦)

١١. ان الذين يؤذون الله و رسوله لعنهم الله في الدنيا و الآخرة و اعد لهم عذابا عظيمنا (الاحزاب: ٥٧)

١٢. انما كان لكم في رسول الله اسوة حسنة لمن كان يرجو الله و اليوم الآخرة و ذكر الله كثيرا (الاحزاب: ٢١)

١٣. ان كان محمد ابنا احد من رجالكم و لكن رسول الله و خاتم النبيين ان الله بكل شيء عليم (الاحزاب: ٤٠)

الحجرات

عن الحسن بن عبد المطلب قال قال رسول الله ﷺ ذاق طعم الايمان من رضى بالله و ربه و بالاسلام و سار و محمد و رسوله

آيات

آيات

١. يا ايها الذين امنوا اتقوا الله و لتنظر نفس ما قدمت لغد و اتقوا الله ان الله خير بما تعملون (الحجرات: ١)

٢. و لا تكونوا كالذين نسوا الله فانسواهم انفسهم اولئك هم الفاسقون (الحجرات: ١٩)

عن

عن ابن مسعود عن النبي ﷺ الا تزول قدما ابن آدم حتى يستل عن خمسه عن عمره في الفناء و عن شابهه فينا ابلح و عن ناله من ابن

كعبه و فيما افقته و ما ذا عمل فيم علم (جامع ترمذي)

٣. عبادات (نماز، زكوة، روزه، حج، جهار)

١. و افلح المؤمنون الذين هم في صلاتهم خاشعون (المؤمنون: ١)

٢. و الذين هم للزكوة فاعلون (المؤمنون: ٣)

٣. يا ايها الذين امنوا حل اذلكم على تجارة تنجيكم من عذاب اليم (الصف: ١٠)

٤. ان الذين يبالون و سبله وجاهدون في سبيل الله يامو اليكم و انفسكم ذكركم خير لك ان كنتم تعلمون (الصف: ١١)

٥. عقرتم ذنوبكم و يدخلكم جنات تجري من تحتها الانهار و مساكن على في حثت فيها ذلك تقربوا اليهم و تقربوا اليهم

٦. (الذين هم على صلواتهم يحافظون. (المؤمنون: ٦)

٧. (الذين هم الزاؤون. (المؤمنون: ٧)

٨. (الذين يرفثون الفردوس. (المؤمنون: ٨)

٩. (هم فيها خالدون. (المؤمنون: ٩)

احاديث

١. عن انس قال: قال رسول الله ﷺ والذي نفسي بيده لا يؤمن عبد حتى يحب ما يحب الله (متفق عليه)
٢. عن النعمان بن بشير قال: قال رسول الله ﷺ: ترى المؤمنين في تراحمهم وتواضعهم وتعاطفهم كمثل الجسد اذا اشتكى عضو تأتت به سائر الجسد بالسهر والحمى (متفق عليه)

٦. آداب معاشرت

١. وان طانفتان من المؤمنين اقتلوا فاصلحوا بينهما فان بغت احدهما على الاخرى فقاتلوا التي تبغي حتى تفيء الى امر الله فان كانت فاصلحوا بينهما بالعدل واقتضوا ان الله يحب المقسطين. (الحجرات: ٩)
٢. انما المؤمنون اخوة فاصلحوا بين اخويكم واتقوا الله لعلكم ترحمون. (الحجرات: ١٠)
٣. يا ايها الذين امنوا لا تخرجوا قوم من قوم عسى ان يكونوا خيرا منهم ولا نساء من نساء عسى ان يكن خيرا منهن ولا تلمزوا أنفسكم ولا تنابزووا بالالقاب بنس الاتم المسوق بعد الايمان ومن لم يتب فان لك تم الغالمون. (الحجرات: ١١)
٤. يا ايها الذين امنوا اجتنبوا كثير من الظن ان بعض الظن اثم ولا تجسسوا ولا يغتب بعضكم بعضا. يحب احدكم ان يأكل لحم اخيه ميتا فكرهوه واتقوا الله ان الله ثواب رحيم. (الحجرات: ١٢)
٥. يا ايها الذين اناخلة: اكرم من ذكر وانثى رجلاكم شعوبا قبايل لعافوا ان كرمكم عند الله اتقاكم ان الله عليم خبير. (الحجرات: ١٣)

احاديث

١. عن ابي هريرة ان رسول الله ﷺ قال: ان المغلس من امتي من يأى يوم القيامة بصلاة و صيام و زكوة، ويأتي قد شتم هباء، و قد ذبح هذا، و اكل مال هذا، و سفك دم هذا، و ضرب هذا، فيعطى هذا من حسنة، و هذا من حسنة، و هذا من حسنة، فان قيل: حسنة كل ان يقضى ما عليه اخذ من خطاياهم فطرح عليه ثم طرح في النار
٢. وكونوا قاسمى دين

١. ومن اظلم ممن افترى على الله الكذب و هو يدعى انى الاسلام والله ا يهدى القوم الضالين. (الصف: ٦١)

٢. يريدون ليطفئوا نور الله باقواهم، والله متم نوره ولو كره الكافرون. (الصف: ٦٢)

٣. هو الذي ارسل رسوله بالهدى ودين الحق ليظهد على الذين كله ولو كره المشركون. (الصف: ٦٣)

احاديث

١. عن ابي سعيد بن الخديري عن رسول الله ﷺ قال من اى منكم من كرا فايغيره بيده فان لم يستطع فبأسانه فان لم يستطع فبقليه ذلك اضعف الايمان (مسلم)

٢. عن عبد الله بن عمر قال: قال رسول الله ﷺ: الا كلكم راع و كلك مسؤول عن رعيته فالامام الذي على الناس راع و هو مسؤول عن رعيته و الراع راع على اهل بيته و هو مسؤول عن رعيته و الراة راعية اى به سزو - يا وولده و هي مسؤوله عليه - و الدائر راع على ما

مال سیدد وهو مسؤل عنه الا فكلکم راع و اذکم مسؤل عن رعیتہ (متفق علیہ)

۳. قال رسول اللہ ﷺ یجاء الرجل یوم القیامۃ فیلقی فی النار فتدلق اقتتابہ فی النار فیطحن فیها کذلحن الحمار برحاء فیتجمع اذ النسا علیہ فیسئلون، ای فلان ماشانک، الس کنت نامرنا بالمعروف ونهینا عن المنکر؟ قال کنت امرکم ونهیکم عن المنکر واتوا

۱. عبد اللہ قال: قال رسول اللہ ﷺ طلب کسب الحلال فریضۃ بعد الفریضۃ (بیہقی: شعب الایمان)

۲. ابی سعید قال: قال رسول اللہ ﷺ التاجر الصدوق الامین مع النبیین والصابقین والشہداء (جامع ترمذی)

باب دوم: مطالعہ سیرت (Seerah Study)

۱. اللہ سیرت کی اہمیت

۲. تائید نفس اور توفیق شخصیت کا بہتری نتائج

۳. تشکیلی معاشرت اور اسوۂ حسنہ

۴. سیرت پرینسپلز اور بیانات مدینہ

۵. انبیاء الہی، انصاف و عظمت

۶. تطبیق سیرت اور

باب سوم: مطالعہ تہذیب و تمدن (Study of Culture)

۱. تہذیب کا مفہوم، انسانی تہذیب کی خصوصیات

۲. بنیادی انسانی حقوق

۳. تہذیب انسانی کے ارتقاء میں مسلمانوں کا کردار

۴. اسلام کا تہذیب و علم

۵. طبیعی علوم، حیاتیاتی علوم اور معاشرتی علوم میں مسلمانوں کا کردار

۶. کالمیں، المذاہب

پرچہ میں ندرتوں کی تقسیم درج ذیل ہو گی

قرآن، حدیث، و فقہی مآلی مطالعہ : ۱۰

مطالعہ سیرت : ۲۰

مطالعہ تہذیب و تمدن : ۲۰

مال سیدد و هو مسؤل عنه الا فكلکم راع و آلكم مسؤل عن رعيتہ (متفق علیہ)

۳. قال رسول اللہ ﷺ یجاء البرجل يوم القيامة فيلقى في النار فتندلق اذنته في النار فيطحن فيها كدليل الحمار بر ساه فيجتمع اهله النساء عليه فيقولون، ای فلان ماشانک، الس كنت تأمرنا بالمعروف وتنهانا عن المنکر؟ قال لئن ابرکت وراثة وراکم عن المنکر وراثة

۱. عبداللہ قال: قال رسول اللہ ﷺ طلب كسب الحادل فريضة بعد الفريضة (ببروقی: شعب الایمان)

۲. ابی سعید قال: قال رسول اللہ ﷺ لتاجر الصدوق الامین مع النبیین والصالحین والشهداء (جامع ترمذی)

باب دوم: مطالعہ سیرت (Seerah Study)

۱. سیرت کی اہمیت
۲. سیرت اور تہذیب کی تعلیم کا ذریعہ
۳. سیرت کی معاشرت اور اسوۂ حسنہ
۴. سیرت کی تعلیم اور مسائل
۵. سیرت کی تعلیم اور معاشرہ
۶. سیرت کی تعلیم اور معاشرہ

باب سوم: مطالعہ تہذیب و تمدن (Study of Culture)

۱. تہذیب کا مفہوم، انسانی تہذیب کی خصوصیات
۲. تہذیب اور انسانی حقوق
۳. تہذیب اور انسانی کے ارتقاء میں مسلمانوں کا کردار
۴. اسلام کا تہذیب و تمدن
۵. تہذیبی علوم، حیاتیاتی علوم اور معاشرتی علوم میں مسلمانوں کا کردار
۶. کالہ میں تہذیب و تمدن

پہرچہ میں مذکوروں کی تقسیم درج ذیل ہو گی

۱۰. قرآن و حدیث اور تہذیب و تمدن کا مطالعہ
۲۰. مطالعہ سیرت
۲۰. مطالعہ تہذیب و تمدن

MATH. 101:**ALGEBRA AND TRIGONOMETRY**

Number systems: Real numbers and properties of real numbers, complex numbers; Quadratic Equations; Quadratic equations, Equations reducible to Quadratic form; Synthetic division: Problems on quadratic equations; Sequences and series: A.P and arithmetic series, G.P. and Geometric series, Harmonic progression:

Binomial Theorem: introduction and applications of binomial theorem;

Fundamentals of trigonometry: Units of measure of angles, relation between arc length and circular measure, central angle, Fundamental identities, Signs of trigonometric functions; Fundamental law of trigonometric deductions (without proofs); Double angle and half angle formulas, conversion of sums and differences in products

Applications of Trigonometry: Problems involving heights and distances (applications of Right triangles), oblique triangles with applications, area of triangles, circles connected with triangles.

Recommended Books:

1. Samshad, M., Ghauri, M. S., Bhatti, Saleem, K. (2005) Algebra and Trigonometry. Union Book Depot, Lahore.
2. Amin, M, Ghauri, M. S., (2000). Calculus and Analytic Geometry Tahir Brothers Urdu Bazar, Lahore.
3. Yusuf, S. M. (2001). Calculus and Analytic Geometry, Ilmi Kitab Khana, Lahore.

PKST-112:**PAKISTAN STUDIES**

1. **Two Nation Theory and Ideology of Pakistan:**
 - a. Definition and meaning.
 - b. Two nation theory in its historical context.
 - c. Contribution of ideology towards Pakistan movement.
 - d. Quaid e Azam and his political ideas.
2. **Political Dynamics of Pakistan**
 - a. a brief history of Constitution making in Pakistan.
 - b. Salient Features of 1973 Constitution of Pakistan.
 - c. Institutions of Pakistan: political parties; Bureaucracy; Army, and Judiciary.
3. **Economy of Pakistan**
 - a. Agricultural problem of Pakistan.
 - b. Industrial problem of Pakistan.
 - c. Salient Features of Pakistan's foreign trade.
4. **Diplomatic Dynamics of Pakistan**
 - a. Determinants and objectives of Pakistan's foreign policy.
 - b. Pakistan's relations with USA, China, India and Afghanistan
 - c. Pakistan and the Muslim world.

Recommended Books:

1. Javed Ahmad Sheikh, (2004), Pakistan's Political, Economical, and Diplomatic Dynamics. Lahore Kitabistan products.
2. Dr. Sikandar Hayat, (1991). Aspects of Pakistan Movement, Lahore: Progressive publishers.
3. M.R Afzal. (1986) Political Parties in Pakistan, 1947-1969. Islamabad.

MATH. 102:**CALCULUS & ANALYTICAL GEOMETRY**

Limit and continuity; Definition and applications; Important formulae (without proofs) Differentiation; Use of the chain rule derivatives of trigonometric, Inverse trigonometric, Exponential and logarithmic functions. Concept of higher order derivatives (Simple cases), Maxima and minima with applications (for function of single variable). Differentials with applications for functions of single variables. Integration; Rules for integration, important functions. Integration by substitution, integration by parts, Definite integrals with applications. Analytic Geometry, Coordinate systems Applications of distance formula, Ratio formula, Slope and equation of line in plane, equation of circle in space, dot, cross and triple products, Differentiation of vectors,

Recommended Books:

1. Samshad, M., Ghauri, M. S., Bhatti, Saleem, K. 2005. Algebra and Trigonometry. Union Book Depot, Lahore.
2. Amin, M, Ghauri, M. S., 2000. Calculus and Analytic Geometry Tahir Brothers Urdu Bazar, Lahore.
3. Yusuf, S. M. 2001. Calculus and Analytic Geometry, Ilmi Kitab Khana, Lahore.

ENG-201:**ENGLISH-III****Course Aims:**

The aim of this course is to train the students in such a manner that they can comprehend and understand English text patterns by applying different analytical strategies. A particular care has been taken to gratify the needs of the learners. The basic aim of this course is to develop critical reading and critical thinking among the students. The course shall enable the learners to develop vocabulary in English by reading dynamic texts and understanding composition patterns in the English language. It shall also give them orientation to different literary genres so that they could themselves be able to compose variety of texts independently.

- Letter Writing: (Official / Formal and must discuss some problem)
- Essay writing
- Reading Skills
- Listening Skills

Poetry:

1. All The World's A Stage
2. On His Blindness
3. Ode To Autumn
4. No Buyers
5. Prayer Before Birth
6. The Owl Critic

William Shakespeare
John Milton
John Keats
Thomas Hardy
Louis MacNiece
J.T. Field

Essays:

1. One Vote For This Age of Anxiety
2. On Babies
3. Islamic Culture

Margaret Mead
Jerome K. Jerome
M. M. Pickthal

Short Stories:

1. Take Pity
2. The Necklace
3. The Happy Prince

Bernard Malamud
G.D. Maupassant
Oscar Wilde

One Act Plays:

1. Even Exchange
2. The Master of The House

Paul S McCoy
W.S. Houston

Recommended Books:

1. Burns & McNamara, (1987). Literature, A Close Study. McMillan.
2. Burton, S.H, (1984) Mastering English Language. McMillan
3. Devitiis, Mariani & O'Malley (1991). English Grammar for Communication. Longman.
4. Gill, G, (1985) Mastering English Literature. McMillan
5. Guddon, J.A,(1991) Dictionary of Literary Terms and Literary Theory. Penguin.
6. Herta A. Murphy & Herbert W. Hildebrandt , (1991). Effective Business Communication McGRAW-HILL, INC.
7. Marie M. Stewart, (1985). Business English and Communication McGRAW-HILL, INC.

ENG-202:

English-IV

Course Aims:

The aim of this course is to train the students in such a manner that they can comprehend and understand English text patterns by applying different analytical strategies. A particular care has been taken to gratify the needs of the learners. The basic aim of this course is to develop critical reading and critical thinking among the learners. The course shall enable the learners to develop vocabulary in English by reading dynamic texts and understand composition patterns in the English language. It shall also give them orientation to different literary genres so that they could themselves be able to compose variety of texts independently.

- Interviews
- Memorandum Writing
- Comprehension & Précis-Writing
- Job-Letter & C. V. Writing
- Report- Writing

Poetry:

- | | |
|--|------------------|
| 1. Departure And Arrival | T.S. Eliot |
| 2. The Road Not Taken | Robert Frost |
| 3. Because I could not stop For Death | Emily Dickinson |
| 4. Say This City Has Ten Million Souls | W. H. Auden |
| 5. The Daisy | Francis Thompson |
| 6. Woman Work | Maya Angelou |

Short Stories:

- | | |
|--------------------|---------------------|
| 1. The Fly | Katherine Mansfield |
| 2. Araby | James Joyce |
| 3. Tell-Tale Heart | E.A. Poe |

Essays:

- | | |
|--|-----------------|
| 1. The Last Sermon by Holy Prophet (Peace Be Upon Him) | |
| 2. Work | Bertrand Russel |
| 3. Three Days to See | Helen Keller |

Novel:

1. The Old Man And The Sea

Ernest Hemingway

Recommended Books:

1. Burns & McNamara, (1987). Literature, A Close Study. McMillan.
2. Burton, .H, (1984). Mastering English Language. McMillan.
3. Devitiis, Mariani & O'Malley ,(1991) English Grammar for Communication. Longman.
4. Gill, G, (1985) Mastering English Literature. McMillan.
5. Guddon, J.A, (1991) Dictionary of Literary Terms and Literary Theory. Penguin.
6. Herta A. Murphy & Herbert W. Hildebrandt, (1991) Effective Business Communication McGRAW-HILL, I
7. Marie M. Stewart, (1985). Business English And Communication. McGRAW-HILL, INC.

COMP- 202: INTRODUCTION TO COMPUTERS

Course Description

The areas covered in this course include: concept of computer, its different types, input and output device concept along with importance of Operating system and its types. Introduction of networks and communication. All features of M/s Word. Ms Excel and MS power point are also covered in this course. For specific relevant topics are covered.

Course Objectives(s)

The goal of this course is to make the students to understand the effect of computers in different areas of life. They will be able to select a computer for particular application. This course also gives understanding of networks and a type of communication devices. The course will develop useful skills in word processing, spreadsheets, and presentation.

Practical programs:

- Computer Hardware
- Computer Software
- MS word
- MS PowerPoint
- MS Excel
- MS outlook
- Internet

Recommended Books:

1. Peter Norton, (2005). Introduction to computers, 6th Edition. John Wiley & sons.
2. Laurie Ann Ulrich, (2003) How to Do Everything with Microsoft Office, McGraw-Hill.

ECON-206: INTRODUCTORY ECONOMICS

Introduction, the economy and the environment, First and Second law of Thermodynamics, economic aspects of environmental problems, pollution control-a general model, estimation of economic losses due to pollution and abatement, valuing the environment and cost-benefit analysis, measuring environmental benefits, economic development and the environment, the economic benefits of different environmental resources, the environmental aspects of different international economic agreements, clean development mechanism, international trade and environment.

Recommended Books:

- 1. B.C. and Field, M.K. (2002) Environmental Economics: An Introduction. Field, 3rd Edition McGraw-Hill/Irwin, UK.
- 2. Kolstad, C.D. (2000) Environmental Economics. Oxford University Press, Oxford.
- 3. Turner, R.K., Pearce, D.W. and Bateman, I. (1993) Environmental Economics: An elementary introduction. Johns Hopkins University Press, USA.

PSYC-203:

Psychology

Introduction to psychology, Use and application of psychology in the world today (with special reference to Pakistan), brief historical background and schools of psychology. Methods of psychology. Environmental psychology; characteristics and research methods. Environmental perception and cognition. Theories of behaviors and behaviors relation. Environmental psychological concerns related to weather and climate change. Psychological theories about disasters: primary and secondary victims and impacts. High population density and psychological impacts.

Recommended Books:

- 1. Bell, P.A., Greene, T.C., Fisher J.D. and Baum A. (2001) Environmental Psychology. 5th Edition. Taylor and Francis Group Publisher. CRC Press, Routledge, London.
- 2. Eysenck, M.W. (1992) Fundamental of Psychology. Taylor and Francis Group Publisher. CRC Press, Routledge London.

STAT 201:

STATISTICS

Unit 1. What is Statistics?

Definition of Statistics, Population, sample Descriptive and inferential Statistics, Observational Data, Discrete and continuous variables, Errors of measurement, Significant digits, Rounding Number, Collection of primary and secondary data, Sources, Editing of Data. Exercises.

Unit 2. Presentation of Data

Introduction, basic principles of classification and Tabulation, Constructing of a frequency distribution, Relative and Cumulative frequency distribution, Diagrams, Graphs and Construction, Bar charts, Pie chart, Histogram, Frequency polygon and Frequency Cumulative Frequency Polygon or Ogive, Histogram, Ogive for Discrete Variable. Tabular frequency curves. Exercises.

Unit 3. Measures of Central Tendency

Introduction, Different types of Averages, Quantiles, The Mode, Empirical Relation between Mean, Median and mode, Relative Merits and Demerits of various Averages. properties of Average, Box and Whisker Plot, Stem and Leaf Display, definition of outliers and their detection. Exercises.

Unit 4. Measures of Dispersion

Introduction, Absolute and relative measures, Range, The semi-Inter-quartile Range, The Deviation, The Variance and standard deviation, Change of origin and scale, Interpretation standard Deviation, Coefficient of variation, Properties of variance and standard Devi Standardized variables, Moments and Moments ratios. Exercises.

Unit 5. Probability and Probability Distributions.

Discrete and continuous distributions: Binomial, Poisson and Normal Distribution. Exercises.

Unit 6. Sampling and Sampling Distributions

Introduction, sample design and sampling frame, bias, sampling and non sampling (sampling with and without replacement, probability and non-probability sampling, Sar distributions for single mean and proportion, Difference of means and proportions. Exercise

Unit 7. Hypothesis Testin

Introduction, Statistical problem, null and alternative hypothesis, Type-I and Type-II errors of significance, Test statistics, acceptance and rejection regions, general procedure for tes hypothesis. Exercises.

Unit 8. Testing of Hypothesis- Single Population

Introduction, Testing of hypothesis and confidence interval about the population mea proportion for small and large samples, Exercises.

Unit 9. Testing of Hypotheses-Two or more Populations

Introduction, Testing of hypothesis and confidence intervals about the difference of popl means and proportions for small and large samples, Analysis of Variance and ANOVA Exercises.

Unit 10. Testing of Hypothesis-Independence of Attributes

Introduction, Contingency Tables, Testing of hypothesis about the Independence of attr Exercises.

Unit 11. Regression and Correlation

Introduction, cause and effect relationships, examples, simple linear regression, estima parameters and their interpretation. r and R^2 . Correlation. Coefficient of linear correlat estimation and interpretation. Multiple regression and interpretation of its parar Examples

- Recommended Books

1. Walpole, R. E, (1982) "Introduction to Statistics", 3rd Ed., Macmillan Publishing Co., Inc. New York.
2. Muhammad, F, (2005) "Statistical Methods and Data Analysis", Kitab Markaz, Bhawana Bazar Faisalabad.

SOCI-204:

SOCIOLOGY

Relationship between environment, culture and society. Goals and expectations. Scope and application. Concept environment. Tripartite nature of environment. Understanding the environment-human relationship. Chrono Perspective of human-environment evolution. Contemporary environmental status. Consumption, globalizati environmental issues. Science and the globalization of environmental discourse. The Ecology of global consumer c otourism's impact on the environment. Contemporary environment issues and debate. Use of environment for interest. power & hegemony.

Recommended Books:

1. Adam, Allan & Carter, (2009) Environmental Risks and the Media,, Routledge, UK.
2. Crumley, C. L. (2001) New Directions in Anthropology and Environment: Intersections, Walnut Cre CA: AltaMira Press.

3. Hannen, Nora and Wilk, R. (2006). *The Environment in Anthropology: A Reader in Ecology, Culture and Sustainable Living*. New York: New York University Press.
4. Townsend, P.K. (2005). *Environmental Anthropology: From Pigs to Policies*. Prospect Heights, IL: Wave land Inc.

GEOL. 105: Introduction to Geology

Introduction and scope of geology its importance and relationship with other sciences. Earth as a member of the solar system; its origin, age, composition and internal structure. Minerals and their physical properties. Introduction to the Moon, Earth's neighbors, meteorites, earthquakes and volcanoes. Weathering and erosion and related landforms. Primary sedimentary, igneous and metamorphic structures. Introduction of folds, faults, joints, cleavage, foliation and unconformities. Isostasy; Introduction to plate tectonics, mountain building processes.

Lab: Study of relief features with the help of models and topographic maps. Simple geological maps and drawing cross-sections. Use of field instruments viz, Brunton compass/clinometer.

Books Recommended:

1. Holmes, A., (1978). *Principles of Physical Geology*, Nelson.
2. Park, R.G., (1983), *Foundation of Structural Geology*. Blackie.
3. Platt, J.I., (1990). *Elementary Exercises upon Geological Maps*, Thomas Murby & Co.
4. Bennison, G.M., (2005). *An Introduction of Geological Structures and Maps*, Thomas Murby & Co.

ENVR.104: Environmental Geology

Introduction to environmental geology. Management of natural resources. Air pollution and global climatic change. Environmental controls for erosion, desertification and coastal degradation. Geological hazards such as landslides, earthquakes, volcanoes, glaciers and shoreline processes, their remedial measures. Environmental impacts of mining, dams, reservoirs, highways, their assessment and controls. Cleaner sources of energy. Industrial pollution, waste disposal, groundwater contaminations, river lake and marine pollution and their impact on human health. Geological aspects of human health. Trace elements and health hazards.

Lab: Sampling and analysis of air, water, soil and rocks.

Books Recommended:

1. Keller, F.A., Chales E. (1990), *Environmental Geology*. Merril Publishing Co.
2. Mazore, E., (1988) *Applied Chemical Groundwater Hydrology*, McGill.
3. Liu, B.C., (1981), *Earthquake Risk and Damage*, West view.
4. Montgomery, C.W., (2005), *Environmental Geology*, McGraw Hill.
5. Armancl, N.A., Polyakove, V.M., (2005), *Radio Propagation and Remote Sensing of the Environment*, CRC Press.

CIEM. 102: Chemistry II(3 credit hours)

Objectives:

Prepare the students with tools of chemistry to apply the concepts and the techniques in their respective discipline.

Course Content:

Gravimetric and volumetric method of analysis; chromatography, TLC, PC, CC ion exchange procedure and application of all these techniques; solvent extraction, classification, important terms involved, types of extraction and factor influencing the extraction system; electro analytical method; basic principles and elementary techniques; conductometer ; potentiometry; PH and EII measurement; atomic absorption techniques, neutron activation technique and mass spectrometry.

Labs: volumetric analysis; calorimetric analysis of Ni, Fe and Mn; PH and EII measurements; atomic absorption, neutron activation and mass spectrometry analyses.

Recommended Books:

1. Gulam Nabi and P.A. Khokar Physical Chemistry for BSc student (Latest edition).
2. Nasar-ud-din Chromatography (Latest edition).
3. See also relevant updated books.