SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DEPARTMENT OF GEOGRAPHY

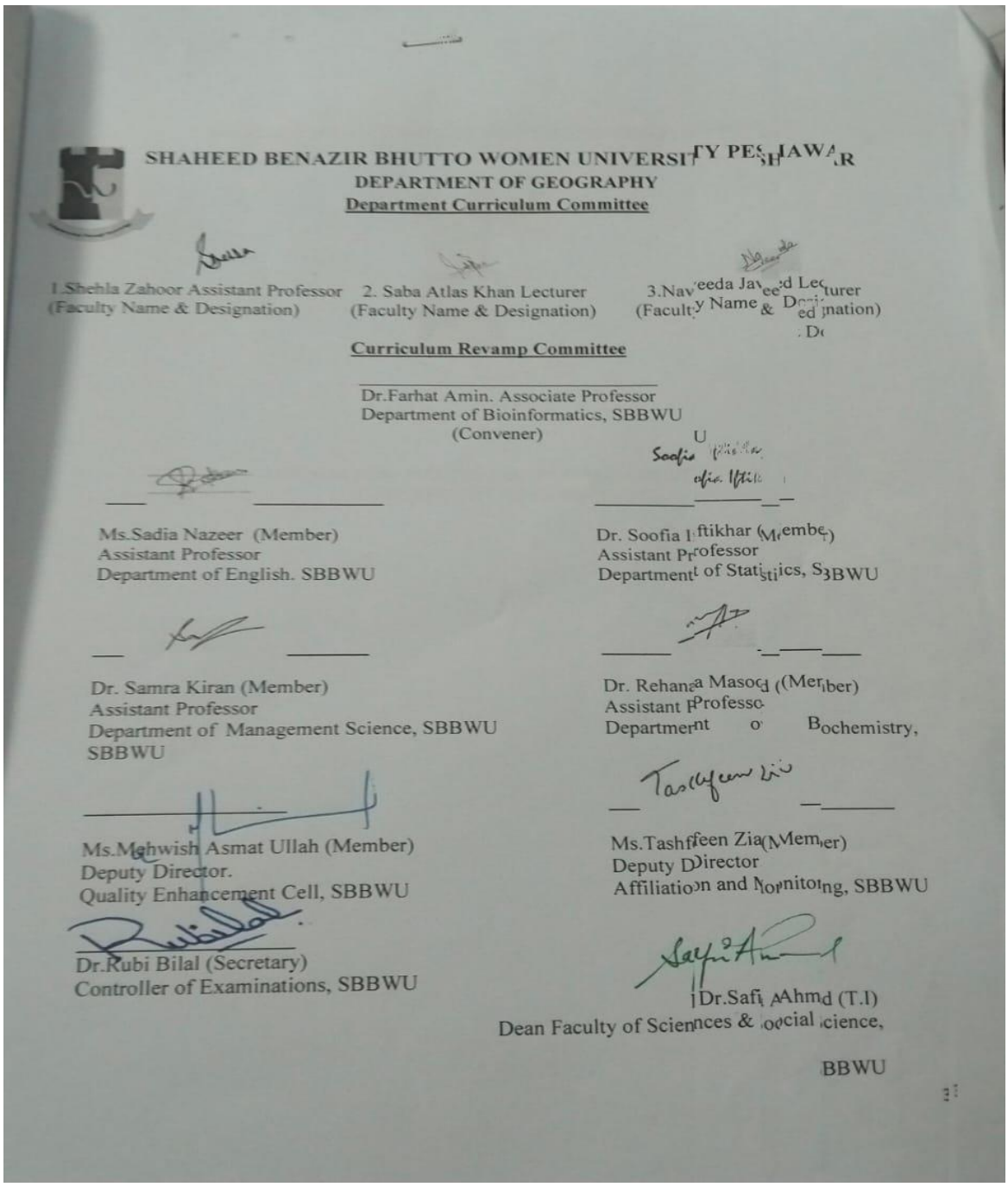
CURRICULUM SESSION 2023 ONWARDS

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

4 Years-BS Geography Curriculum Session 2023-onwards

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR
DEPARTMENT OF GEOGRAPHY

Department Curriculum Committee



SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR
DEPARTMENT OF GEOGRAPHY
Department Curriculum Committee

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2. Saba Atlas Khan Lecturer (Faculty Name & Designation)
3.Naveeda Javeed Lecturer (Faculty Name & Designation)

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Affiliation and Monitoring, SBBWU

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Controller of Examinations, SBBWU

Dr.Safi Ahmad (T.I)
Dean Faculty of Sciences & Social Science,
BBWU

INTRODUCTION TO DEPARTMENT OF GEOGRAPHY

The Department of Geography is a newly established department in Shaheed Benazir Bhutto Women University. Geography is the most interdisciplinary subject and it is also the most integrated discipline on campus, insofar as the material taught in our classes about environmental processes can be found in other disciplines, but are only put together as a whole story in Geography. Above all, Geography is "spatial"—virtually everything has a spatial component, from the distribution of subatomic particles to the choices we make when we buy groceries. Therefore, as a Geographer, one can choose to study an enormous range of subjects. Geography is also an extremely hands-on discipline with a strong emphasis on using computer–based tools and participating in field studies. Knowing where things are, why they got there, and how they work is critical to understanding our world today and how it is changing—this is Geography! The Department of Geography is represented by Three Crosscutting Themes, Earth System Science: the physical and biological processes of the environment, Human Geography: the way humans perceive, interact with, and modify the environment, Modeling, Measurement, and Computation: techniques for the collection, analysis, and interpretation of geospatial data using tools such as GIS, remote sensing, and spatial statistics.

With roots in exploration, map making, and accounts for differences from place to place, modern geography investigates the spatial organization and material character of planet Earth and the physical and human processes that shape its places and landscapes. Geographers study many different topics and places, but they share a concern with what can be learned from analyzing spatial arrangements (both perceptual and actual) and the changing characteristics of places and landscapes. In pursuit of their work, geographers employ a wide range of tools including field exploration, map making, geographic information analysis, textual analysis, and modeling. The teaching and research undertaken in Geography explores biophysical changes (global and local) shaping the planet; the prospects and challenges of fostering sustainability; the nature and implications of geopolitical, economic, and cultural shifts in different parts of the world; and the nature, use, and understanding of maps and geospatial technologies.

The study of Geography is exciting, challenging and relevant to today's world. Geographers study the natural processes of the physical environment, as well as the activities and consequences of humans in this environment. Some geographers specialize in coastal, glacial or fluvial processes and landforms, climatology, biogeography, hydrology or environmental change. Others study regional economics, population change, and the problems of rural or urban areas. Still others, specializing in spatial analysis, bring the power of geographic information science to bear on a wide range of research problems. Increasingly, these varied interests are coming together in the study of environmental problems and Geographers lead the way in resource management.

VISION

"To provide quality education with the latest and advanced techniques and matters of research in order to equip the students for enabling them to take the challenges of current lives and work for the well-being of the society. "

MISSION

The Department's mission is

To provide a complete understanding of the range and depth of interdisciplinary and technical approach which signifies the human and physical spheres of geography. This understanding enableas the students to utilize their full potential as skilled professionals and well-qualified technical eexperts in various fields like companies and government organizations to promote fruitful careers, active life-long knowledge, and desire to contribute positively towards society.

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DEPARTMENT OF GEOGRAPHY

BS 4-YEAR GEOGRAPHY

Geographers study the earth's features but with a strong appreciation for the human-environment relations that shape and are shaped by the distributions of these features across the landscape. Geography is an interdisciplinary field that connects ecological, atmospheric, hydrologic, and geologic sciences to understanding the impacts of a dynamic and changing landscape.

With the B.S. in Geography, students can focus on specific areas such as climate change, fire history, biogeography, arid lands, or other topics that bridge the physical sciences. They will learn to analyze data, use cartographic and geographic information systems, and work in the field and in remote-sensing laboratories. Internships are integral to the major and credit can be earned for internships in the public private and non-profit sectors.

PROGRAMME OBJECTIVES

The BS Program objectives are to ;

1. learn how human, physical and environmental components of the world interact.
2. discover geographic theory and its use in understanding real world processes.
3. acquire geographic analytical skills that can be applied to a variety of research and professional tasks where the analysis of spatial information is required.

LEARNING OUTCOMES OF THE PROGRAMME

The students shall be able to :

1. articulate the theories, philosophies, and concepts in the discipline of geography, the inter-relationship between people and places, and the interactions between nature and society.
2. understand the concepts of urbanization and sub-urbanization, including the variety of forms and structures that cities take around the world.
3. understand the fundamental concepts of spatial interaction and diffusion, which explain how human activities are influenced by the concept of distance.

ADMISSION REQUIREMENT

ELIGIBILITY

Intermediate or equivalent (all disciplines) not less than 45% marks.

DURATION

Four years program spread over 8 semesters, two semesters per year.

COURSE AND CREDIT REQUIREMENTS

As per the HEC new Undergraduate Policy , a total number of 120-144 Credit hours is required.

EVALUATION

For uniformity in the evaluation system, NCRC recommends that the minimum CGPA required for award of degree is 2 out of 4.0 at undergraduate level subject to meet all requirements of the university.

Sr.	Categories	Credit Hours Min – Max
1.	General Education (Gen Edu) Requirements: Mandatory Courses of General Education.	30 – 30
2.	Major (Disciplinary) Requirements: Area of Study in Which the Degree is offered	*72 ≥
3.	Interdisciplinary/Allied Requirements (To Support Horizon of the Major)	**12 ≥
4.	Field Experience/Internship (Practical Work Experience related to a Student's Field of Study or Career interest)	03 – 03
5.	Capstone Project or Capstone Research Project	03 – 06
	Total	**120 – 144**

STRUCTURE

***The Credit Hours for the courses of Major Disciplines may vary but not less than 72 Credit Hours.**
****The Credit Hours for Interdisciplinary/Allied Courses may vary but not less than 12 Credit Hours.**

- Total number of Credit hours — 120-144
- Duration — 4 years
- Semester duration — 16-18 weeks
- Semesters — 8
- Course Load per Semester — 15-18 Cr.Hrs
- Number of courses per semester — 4-6 (not more than 3 lab / practical courses)

LAYOUT

Sr.No	General Education (Gen Edu) Requirements: Mandatory Courses of General Education. Note: Courses can be selected from the booklet of Mandatory Courses of General Education.	
	12 Courses	
	30 Credit Hours	
	Subject	**Credit Hours**
1	Functional English	3
2	Expository Writing	3
3	Quantitative Reasoning, I	3
4	Quantitative Reasoning, II	3
5	Islamic Studies/Religious Education /Ethics	2
6	Ideology and Constitution of Pakistan	2
7	Application of Information and Communication Technologies	3(2+1)
8	Introduction to Entrepreneurship	2
9	Civics and Community Engagement	2
10	Arts & Humanities	2
11	Social Science	2
12	Natural Science	3
	Total Credit Hours	**30**

S.No	**Interdisciplinary/Allied Requirements (To Support Horizon of the Major).** The Credit Hours for Interdisciplinary/Allied Courses may vary but not less than 12 Credit Hours, to be chosen from other departments. **Note:** In addition to the below, the university can offer any other which they feel necessary subject to the availability of resources.	
	4 Courses	
	12 Credit Hours	
	Subject	**Credit Hours**
1	A Survey Course of World Civilizations	3
2	General Science	3
3	Cell biology	3
4	Biodiversity of Animal Life	3

S. No	**Major (Disciplinary) Requirements: Area of Study in Which the Degree is offered**	
	The Credit Hours for the courses of Major Disciplines may vary but not less than 72 Credit Hours.	
	72 Credit Hours	
	Subject	**Credit Hours**
1	Fundamentals of Geography	3
2	Physical Geography	3
3	Human Geography	3
4	Map Work	3

5	Geography of Pakistan	3
6	History & Development of Geographical Thought	3
7	Land Surveying	3
8	Climate Change Studies	3
9	Geography of natural hazards and disasters	3
10	Techniques in geography	3
11	Fundamentals of Cartography	3
12	Geomorphology	3
13	Climatology	3
14	Oceanography	3
15	Economic Geography	3
16	Quantitative Geography	3
17	Environmental Geography	3
18	Geographical Information Science	3
19	Remote Sensing and Image Processing	3
20	Political Geography	3
21	Geodesy and Satellite Navigation System	3
22	Region & Regional Concept	3
23	Settlement Geography	3
24	Research Methodology	3
	Total credit hours	72

S.No	Field Experience/Internship (Practical Work Experience related to a Student's Field of Study or Career interest)		
	Subject	**Credit Hours**	**Course Codes**
1.	Internship/Field Experience	3	GEOG-698

S.No	Capstone Project or Capstone Research Project		
	Subject	**Credit Hours**	**Course Codes**
1.	Capstone Research Project	3	GEOG-699

S.No	**Courses to be offered to other departments under the category of Natural Sciences**.		
	Subject	**Credit Hours**	**Course Codes**
1.	Fundamentals of Geography	3(2+1)	GEOG-311
2.	Geography of Pakistan	3(2+1)	GEOG-411

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

SCHEME OF STUDIES OF BS 4 YEARS DEGREE IN GEOGRAPHY_SESSION 2023 AND ONWARDS

SCHEME OF STUDIES OF BS -GEOGRAPHY_4-YEAR PROGRAM

(SESSION 2023 & Onwards)

Semester	Category	Course Codes	Course Title	Lectures	Lab	Cr.Hrs
Semester 1	Art & Humanities		Art and Humanities(any course from the approved list)	2	0	2
	Islamic Studies/Religious Education/Ethics	ISL-301	Islamic Studies	2	0	2
	Interdisciplinary/Allied	HIS-302	A Survey Course of World Civilizations	3	0	3
	Functional English	ENG-303	Functional English	3	0	3
	Major I	GEOG-311	Fundamentals of Geography	2	1	3
	Major II	GEOG-312	Physical Geography	2	1	3
			Total			**16**
Semester2	Social Sciences		Social Sciences (any course from the approved list)	2	0	2
	Expository Writing	ENG-304	Expository Writing	3	0	3
	Interdisciplinary/Allied	ZOL-301	General Science	3	0	3
	Ideology and Constitution of Pakistan	PST-313	Ideology and Constitution of Pakistan	2	0	2
	Major III	GEOG-321	Human Geography	2	1	3
	Major IV	GEOG-322	Map Work	2	1	3
			Total			**16**
Semester 3	Quantitative Reasoning (QR I)	MTH-401	Quantitative Reasoning (QR I)	3	0	3
	Application of Information and Communication Technologies.	CSC-308	Application of Information and Communication Technologies.	2	1	3
	Natural Science		Natural Science(any course from the approved list)	3	0	3
	Entrepreneurship	MS-309	Introduction to Entrepreneurship	2	0	2
	Major V	GEOG-411	Geography of Pakistan	2	1	3
	Major VI	GEOG-412	History & Development of Geographical Thought	2	1	3
			Total			**17**
Semester 4	Civic and Community Engagement	PSC-418	Civic and Community Engagement	2	0	2
	Quantitative	MTH-402	Quantitative Reasoning	3	0	3

	Reasoning (QR II)		(QR II)			
	Major VII	GEOG-421	Land Surveying	2	1	3
	Major VIII	GEOG-422	Fundamentals of Cartography	2	1	3
	Major IX	GEOG-423	Geography of natural hazards and disasters	2	1	3
	Interdisciplinary/Allied	ZOL-302	Biodiversity of Animal Life	2	1	3
			Total			**17**
Semester 5	Major X	GEOG-511	Geomorphology	2	1	3
	Major XI	GEOG-512	Climatology	2	1	3
	Major XII	GEOG-513	Oceanography	2	1	3
	Major XIII	GEOG-514	Economic Geography	2	1	3
	Major XIV	GEOG-515	Settlement Geography	2	1	3
	Interdisciplinary/Allied	BIT-303	Cell biology	2	1	3
			Total			**18**
Semester 6	Major XV	GEOG-521	Political Geography	2	1	3
	Major XVI	GEOG-522	Environmental Geography	2	1	3
	Major XVII	GEOG-523	Geographical Information Science	2	2	3
	Major XVIII	GEOG-524	Remote Sensing and Image Processing	2	1	3
	Major XIX	GEOG-525	Quantitative Geography	2	1	3
	Major XX	GEOG-526	Research Methodology	3	0	3
			Total			**18**
Semester 7	Internship/Field Experience	GEOG-698	Internship/Field Experience	3	0	3
	Major XXI	GEOG-611	Techniques in Geography	2	1	3
	Major XXII	GEOG-612	Geodesy and Satellite Navigation System	2	1	3
	Major (elective)XXIII		courses from the list of electives will be selected.	2	1	3
	Major(elective)XXIV		courses from the list of electives will be selected.	2	1	3
			Total Cr.Hrs.			**15**
Semester 8	Major XXV	GEOG-621	Region & Regional Concept	2	1	3
	Major XXVI	GEOG-622	Climate Change Studies	2	1	3
	Major XXVII (elective)		courses from the list of electives will be selected.	2	1	3
	Major XXVIII (elective)		courses from the list of electives will be selected.	2	1	3

	Capstone Research Project OR Capstone Project	GEOG-699	Capstone Research Project	3	0	3
			Total Cr. Hrs. **Total Credit Hours of the Program: 132**			**15**
	Major Elective can be selected from elective subjects list subject to the availability of the teacher.					

Elective Courses within the major
4 Courses
12 Credit Hours
Any two of the courses may be opted from the following elective courses(course contents are in annexure-A).

Sr. No	**Subject**	**Credit hours**	**Course Codes**
1.	Regional Planning	3	GEOG-625
2.	Urban Planning	3	GEOG-626
3.	Geography of Muslim World	3	GEOG-627
4.	Environmental Geography	3	GEOG-628
5.	Applied Geomorphology	3	GEOG-629
6.	Rural Geography	3	GEOG-630
7.	Transportation Geography	3	GEOG-631
8.	Geography of South & South East Asia	3	GEOG-632
9.	Cultural Geography	3	GEOG-633
10.	Population Geography	3	GEOG-634
11.	Geography of resource conservation	3	GEOG-635

DETAILED COURSE OUTLINE OF BS 4 YEARS DEGREE IN GEOGRAPHY SESSION 2023 AND ONWARDS

SEMESTER – I

Course Title: Art and Humanities(any course from the approved list)	**Course Code:**
Course Structure: Lectures, 2 Hours	**Credit Hours:** 2
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Name: Islamic Studies	**Course Code:** ISL-301
Course Structure: Lectures:2, Practical: 0	**Credit Hours:** 2(2+0)
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Name: A Survey Course of World Civilizations	**Course Code:** HIS-302
Course Structure: Lectures: 3, Labs: 0	**Credit Hours:** 3

Course Objective:

1. Discuss the evolution and rise of the major civilizations of the ancient world and their education.
2. Discuss their contributions to the present day world.
3. To dig out the causes of their downfall.

Course Outline: This course introduces students to the Indus Valley Civilization; its background**,** discovery, location, religion, Priest King**,** Administration**,** Economy**,** Culture**,** Art and Architecture**,** Contributions,Gandhara Civilization; Background, Discovery, Location, Religion, Administration, Culture, Contributions**.** Egyptian Civilization; Background**,** Discovery**,** Location**,** Religion**,** Status of Pharaoh**,** Administration**,** Economy**,** Culture**,** Status of Women**,** Mummification**,** Contributions.

Course Outcomes:

At the end of the course, students will be able to:

1. Demonstrate an understanding of the main features of the political and socioeconomic organization of a range of past civilizations.

2. Demonstrate knowledge of the main features of a past civilization's cultural heritage as reflected in its arts, sciences, and literature.

Recommended Books:

1. Burkitt, M.C. Our Early Ancestors. Cambridge: 1929.
2. Burns, E.M. and Ralph, P. L. World Civilizations, Latest Edition.
3. Easton, Stard C. The Heritage of the Past Earliest times to 1500. USA: 1970.

4. Frankfort, Henri. The Art and Architecture of the Ancient Orient. London: 1958.
5. Geddes and Grosset, Atlas of World History, Scotland, 1997.
6. Gibb, H. A. R., Studies on the Civilization of Islam, ed. Stanford J. Slaw, London, 1962.
7. Graig, A.M., The Heritage of World Civilizations, II Vols, New York, 1986.
8. Kosambi, D. D., The Culture and Civilization in Ancient India: An Historical Outline, New Delhi, 1982.
9. Langer, W.L., AnEncyclopaedia of World History. New York: Simon & Schuster, 1972.
10. Tannebaum, Edward R. *A History of World Civilisations*. USA: Simon & Schuster, 1973.
11. Hornblow, Leonora. Cleopatra of Egypt. New York: 1961
12. Kosambi, D. D., The Culture and Civilization in Ancient India: An Historical Outline, New Delhi, 1982.

Course Name: Functional English	**Course Code:** ENG-303
Course Structure: Lectures:2, Practical: 0	**Credit Hours:** 2(2+0)
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Name: Fundamentals of Geography	**Course Code:**GEOG-311
Course Structure: Lecture 3	**Credit hours:** 3(2+1)

Course Objective:

1) To expose students to the founding principles of Geography and geographical knowledge.
2) To abreast students with various terms employed in the understanding of different geographical processes and functions**.**

Course Outline: This course introduces students to the basic principles of Geography and Geographical Knowledge; Introduction, Definitions, scope and branches of Geography, Roots of the discipline and basic geographic concepts, Themes and traditions of Geography, Tools of Geography, the Universe Galaxies and solar system, Earth as a planet, Celestial positions, its shape and size, Rotation, revolution and related phenomena, Spheres of the earth, Lithosphere, Atmosphere, Hydrosphere, Biosphere, Man-environment interaction, Population, Major Economic activities Settlements etc.

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

Course Outcomes:

At the end of the course, students will be able to:

1. Understand the fundamentals of Geography

2. Comprehend the key concepts of earth's evolution as a part of the universe, and its major

spheres.

Recommended Books:

1. Dada, Anup (December 2022). "The Process of Geomorphology Related to Sub Branches of Physical Geography". Black Sea Journal of Scientific Research.

2. Eratosthenes (2010). Eratosthenes' "Geography". Fragments collected and translated, with commentary and additional material by Duane W. Roller. Princeton University Press.
3. Adam Dastrup (2021)"Physical Geography and Natural Disasters" . California Open Online Library.
4. Ritter (2021)"The Physical Environment: an Introduction to Physical Geography" California Open Education Resource Council CA OER.
5. Patrich and Radtke (2020)"Physical Geography – Version 1" Publisher: College of the Canyons.
6. Arbogast, A. F. (2017). Discovering Physical Geography, Fourth Edition: John Wiley & Sons, lncorporated.
7. Dahlman, C. H., Renwick, W. H., & Bergman, E. (2015). lntroduction to Geography: People, Places & Environment, Global Edition: Pearson Education Limited'
8. Dunbar, G. S. (2016). Modern Geography: An Encylopaedic Survey: Taylor & Francis.
9. Knox, P. 1., & Marston, S. A. (2015). Human Geography: Places and Regions in Global Context: Pearson.
10. Mayhew, S. (2015). A Dictionary of Geography: Oxford University Press.
11. Nagle, G., & Cooke, B. (2017). lb Geography Course Book2nd Edition: Oxford lb Diploma Programme: Oxford University Press,
12. Francis. 9. Rubenstein, J. M. (2015). Contemporary Human Geography: Pearson Education.

Course Name: Physical Geography	**Course Code:** GEOG-312
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objective:

1) To create understanding about the physical characteristics of the earth
2) To abreast the students with the knowledge of the physical principles and processes governing the circulation and characteristics of the atmosphere and climates on Earth.

Course Outline: This course introduces the science of Physical Geography using an earth-systems approach. Course themes include the Internal structure of the earth, Rocks–origin, formation, and types: Igneous, Sedimentary, and Metamorphic Rocks, Plate tectonics, mountain building forces, Realms of the physical environment, Hydrological cycle, Formation and types of soils, Geomorphic processes – endogenic and exogenic processes and their resultant landforms, Earthquakes and volcanic activity, folding and faulting, Weathering, mass wasting, cycle of erosion, erosion and deposition, Landforms produced by running water, ground water, wind and glaciers.

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.

Course Outcomes:

At the end of the course, students will be able to: 1. Understand the directional and locational systems employed on the surface of the Earth 2. Enable to analyze the distribution and dynamics of organisms and their environments.
Recommended Books: 1. Reynolds, S. J., Rohli, R. V., Johnson, J. K. (2017). Exploring Physical Geography. United States: McGraw-Hill Higher Education. 2. Thomas, D. S. G. (2015). The Dictionary of Physical Geography. Germany: Wiley. 3. Arbogast, A. F. (2011). Discovering Physical Geography. United States: Wiley Custom Learning Solutions. 4. Newbigin, M. I. (2018). An Introduction to Physical Geography (Classic Reprint). United States: Fb&c Limited. 5. Jeremy Patrich (2020)Physical Geography Version 1, Publisher College of the Canyons 6. McKnight's Physical Geography: A Landscape Appreciation, Pearson; 12th edition (2016) 7. Peterson, J. F., Sack, D. & Gabler, R. E. (2011) "Physical Geography", Brooks Cole. 8. Strahler, A. (2013) Introduction to Physical Geography, John Wiley & Sons,New Jersey. 9. Strahler, A. H., Potosnak, M. (2010). Physical Geography. Canada: John Wiley & Sons, Incorporated. 10. Thornbury, W. D. (2004) Principles of Geomorphology, John Willy & Sons,New York. 11. .Thurman, H. V. & Trujillo, A. P. (2013) Essentials of Oceanography,Prentice-Hall, Inc, New York.

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DETAILED COURSE OUTLINE OF BS 4 YEARS DEGREE IN GEOGRAPHY SESSION 2023 AND ONWARDS

SEMESTER – II

Course Name: Social Sciences (any course from the approved list)	**Course Code:**
Course Structure: Lectures: 2	**Credit Hours:** 2
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Name: Expository Writing	**Course Code:** ENG-304
Course Structure: Lectures: 2	**Credit Hours:** 3
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Title: General Science	**Course Code:** ZOL-301
Course Structure: Lectures: 3, Labs: 0	**Credit Hours:** 3

Prerequisites: None

Course Objective: The objectives of this course are:

- The course covers core concepts in physical science, life science, and earth science.
- To study the interdependence of ecosystems and the organisms
- To study evolutionary forces to the diversity of ecosystems and of the species within them.

Course Outline: Course Overview; Science in Personal and social perspective: The Nature of science and scientific investigation (observations, inferences) Teaching of science: reflect upon the way prospective teachers learned science and how they want to teach science when they graduate. Populations and Ecosystems; Basic needs of living things: Interdependencies of living things (symbiotic relationships), Ecosystems and Habitats: Population Growth, survival and Extinction, Populations and Ecosystem, Diversity and Adaptations; Diversity of living things: systems of classification, Adaptations for survival: Evolution and Diversity, Diversity and Adaptation, Earth –The Blue Planet; Earth - an inhabitable planet: Weather and Seasons, Categorizing the world by continents, biomes, vegetation zones, climate zones, etc. Introduction to maps; reading and creating simple data charts, Constant changes on earth: Erosion/sedimentation, Earthquakes and Volcanoes, Force and Motion; Relationship among force, mass, and motion of an object, Interaction of objects as it relates to force and linear, constant motion. Graphing of motion and basic calculations of speed and average speed, Non-linear motion and accelerated motion (Laws of motion), Graphing of nonlinear and accelerated motion, Properties and Matter, Physical properties of matter, including melting point, boiling point, hardness, density, and conductivity, Atoms, molecules, mixtures, elements, and compounds, Introduction to the periodic table, States of matter: solid, liquid, gas (examples of water), Introduction to models and their limitations in science teaching.

Course Outcomes: Upon successful completion of this course, the students will be able to:

- Identify the effects of human activities and naturally occurring changes on ecosystems and the consequences of those changes.
- Be able to describe a chemical reaction in the context of a rearrangement of atoms and also in the context of the formation of a new substance with new properties.
- Acquire the knowledge about relationships among force, mass, and motion of an object or system.

Recommended Books:

1. Fullick, S. Cambridge Lower Secondary Complete Biology: Student Book. Second Edition. 2021. OUP Oxford.
2. Mukherji. S. Encyclopedia of General Science for General Competitions. 2021. Arihant Publication.
3. Urry, L.A., Campbell, N.A., Campbell biology: 2021. Australian and New Zealand version. Pearson Australia.
4. Callister Jr, W.D. and Rethwisch, D.G., Fundamentals of materials science and engineering: an integrated approach. 2020. John Wiley & Sons.
5. Campbell, N.R., Foundations of science. 2020. BoD–Books on Demand.
6. Fowler, S., Roush, R. and Wise, J. Concepts of biology. ., 2018. OpenStax College, Rice University.

Course Title: Ideology and Constitution of Pakistan	**Course Code:** PST-313

Course Structure: Lectures: 2	**Credit Hours:** 2
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Name: Human Geography	**Course Code:** GEOG-321
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives:

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

Course Outline. This course introduces the scope and branches, basic approaches, Environmental determinism, Possibilism, Probabilism, Cognitive behaviorism, Coupled nature-human systems, Population and its characteristics, Population distribution, Population structure and composition, Population dynamics (fertility, mortality, migration etc.) ,Economic activities, Classification of Economic Activities, Agriculture, mining, forestry, animal husbandry and poultry. Industries: cottage, light and heavy. Trade, transport and services. Tourism, Settlements, Theories of human settlement, Types of settlements, Rural settlements, dispersed, nucleated and Ribbon settlements, Urban Settlements, Urban hierarchy and functions, Urbanization. Process of urbanization, Urban structure, morphology and theories. Land use and land cover patterns. 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**.**

Course Outcomes: At the end of the course, students will be able to:

1. Understand the relation between man and environment.

2. Environmental issues, causes and remedies.

Recommended Books:

1. Marsh, M., Alagona, P. S. (2022). AP Human Geography.United States: Barrons Educational Services.
2. Gillespie, C. A. (2022). 5 Steps to a 5: AP Human Geography 2023. United States: McGraw Hill LLC.
3. Encyclopedia of Human Geography. (2020). Netherlands: Elsevier.
4. Karmarkar, Dipesh & Bhide, Dr. (2021). Human Geography.
5. Majid Husain,(2018)Human Geography 5/Ed, Publisher Rawat Publications
6. Peter Daniels, Michael Bradshaw, Denis Shaw, James Sidaway, Tim Hall.(2016)An Introduction to Human Geography, 5th edition e-book.
7. Dhruv Bhagat (2015)Contemporary Human Geography Published by Vidya Books
8. Fouberg, E. H. (2012) Human Geography People, Place and Culture,John Wiley & Sons, Inc., Hoboken.
9. .Knox, P. L. & Marston, S. A. (2012) Places and Regions in Global Context: Human Geography, Prentice Hall, New York.
10. UNDP(UNDP), (2012) “Human Development Reports”, http://hdr.undp.org/en/
11. Knox, P. (2010) “Places and Regions in Global Context”, 5th Edition, Prentice Hall, New York.
12. Todaro, M.P & Smith, S. (2011) “Economic Development”, 11th Edi. Prentice Hall,New York.
13. Clifford, N., (2010) “Key Methods in Geography”, 2nd Edition. SAGE Publications Ltd.

14. Deblij, H. J., Murphy, A. B. & Fouberg, E.H. (2012) "Human Geography: Culture,Society and Space", 10th Edition. John Wiley & Sons Inc., Canada.
15. Harper, H. L. (2012) "Environment and Society: Human Perspectives on Environmental Issues", 5th Edition, Prentice Hall, New York.
16. 3. Fouberg, E. H. (2012) "Human Geography People, Place and Culture", John Wiley & Sons, Inc.,

Course Name: Map Work	**Course Code:** GEOG-322
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives:
To train students in map drawing, reading and its use for geographical analysis.

Course Outline: This course introduces the Maps: its elements and types**.**Principles and methods of map making, reading and reproduction.Scale: types and their use, grid reference and indexation, Map projections: choice, construction, characteristics, and uses**.**Enlargement and reduction of maps**.**A study of the Survey of Pakistan maps**.**Physical and cultural features to be described and interpreted**.**Interpretation of weather maps of Pakistan
Field visits: Visit to Survey of Pakistan and Pakistan Meteorological Departments.

Course Outcomes: At the end of the course, students will be able to:

1. Understand maps ,its elements and types.

2. Physical and cultural features to be described and interpreted**.** Interpretation of weather maps of Pakistan.

Recommended Books:

1. Peter Anthamatten. (2021) How to make Maps, Publisher : Routledge London, United Kingdom
2. Alexander, Isabella. 2023. Copyright and Cartography: History, Law, and the Circulation of Geographical Knowledge. London: Bloomsbury Academic.
3. Beck, Lauren, ED. 2023. "The Social Lives of Maps." Vol. 3. Material Culture Review
4. Benus, Benjamin. 2023. Herbert Bayer's World Geo-Graphic Atlas and Information Design at Midcentury. Rochester, NY: RIT Press.
5. Demhardt, Imre Josef, ed. 2021. Mapping the Ottoman Realm: Travelers, Cartographers and Archaeologists: 8th International Symposium of the ICA Commission on the History of Cartography. Proceedings of the ICA, 3.
6. Hannam, James. 2023. The Globe: How the Earth Became Round. London: Reaktion Books.
7. Horner, A. A. 2023. Mapping South Kerry: 450 Years of Maps and Changing Landscape. Dublin: Wordwell.
8. Parker, Philip. 2023. To the Ends of the Earth: How the Greatest Maps Were Made. London: Ivy Press.

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SEMESTER – III

Course Title: Quantitative Reasoning-I	**Course Code:** MTH-401
Course Structure: Lectures:3	**Credit Hours:** 3
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Title: Applications of Information and Communication Technologies	**Course Code:** CSC-308
Course Structure: Lectures: 2 Lab:1	**Credit Hours: 3**
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Title: Natural Science(any course from the approved list)	**Course Code:**
Course Structure: Lectures: 3, Labs: 0	**Credit Hours: 3**
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Title: Introduction to Entrepreneurship	**Course Code:** MS-309
Course Structure: Lectures: 2	**Credit Hours: 2**
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Name: Geography of Pakistan	**Course Code:** GEO-411
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)
Course 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: This course introduces the Geo-strategic position of Pakistan**,** Location and Geographical significance**,** Geo-political Importance**,** Administrative setup**,** Land and Physical Environment:**,** Physiography**,** Climate and climatic regions**,** Hydrology**,** Soils and vegetation**,** The People**,** Population characteristics: structure, composition and Distribution, Population Change, Urbanization, Economy, Agriculture (crops and livestock), Irrigation, Power and mineral resources, Industries, Trade, Tourism, Transport and Communication, Major challenges of Pakistan, 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, mining area, national parks, industrial areas and various rural and urban settlements and other natural resources.

Course outcome: At the end of the course, students will be able to:

1. Understand Major challenges of Pakistan, Water, power, security and environmental issues.

Recommended Books

1. Devasher, T. (2024). Pakistan Insights 2023. India: Pentagon Press Llp.
2. Fitzpatrick, H. (2024). Mapping Partition: Politics, Territory and the End of Empire in India and Pakistan. United States: John Wiley & Sons.
3. Mustafa, D. (2021). Contested Waters: Sub-national Scale Water and Conflict in Pakistan. United Kingdom: Bloomsbury Academic.
4. Small, A. (2020). The China-Pakistan Axis: Asia's New Geopolitics. United States: Oxford University Press.
5. Rehman, A. (2013). Mapping Lahore: Tracing Historical Geography of a City Through Maps. Pakistan: Al-Mezaan Publishers and Book Sellers.
6. QURESHI, A., QURESHI, I., QURESHI, S. (2018). Geography of Pakistan. (n.p.): Independently Published.
7. Graham, I. (2009). Pakistan. United States: Sea-to-Sea Publications.
8. Blashfield, J. F. (2011). Pakistan. United Kingdom: Raintree.
9. Khan, F. K. (2011). Oxford Atlas for Pakistan, New Edition. Pakistan: Oxford University Press.
10. Marsh, W. M., Kaufman, M. M. (2013). Physical Geography: Great Systems and Global Environments. United Kingdom: Cambridge University Press.
11. Abbasi, B. A. (2008). Geography of South Asia : as a whole region. Pakistan: Sang-e-Meel Publications.
12. Fazle Karim Khan ,(2008)A Geography of Pakistan: Environment, People and Economy, Oxford University Press
13. Pakistan Minerals Development Corporation: www.pmdc.gov.pk

Course Name: History & Development of Geographical Thought	**Course Code:** GEO-412
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives: To study the evolution of geographic thought and concepts.

Course Outline: This course introduces the nature of Geography**, e**volution of Geography**,** Pre-classical and classical periods: ancient Geography**,** Medieval Geography: Muslim contributions, European contributions.Modern Geography: Humboldt and Ritter, Geography from the middle of the 20th century, Dichotomies-physical and human, systematic and regional. Quantitative Revolution, Geoinformatics and Ecology. Established traditions: Earth science, area study, spatial organization,man-land, system analysis and cartographic science. Man-environment interaction themes: Environmental Determinism,Possibilism, Probabilism, Cognitive Behaviourism, World views on man-environment relationship. Development of Nomothetic traditions: facts, concepts, hypotheses and paradigms, Ideographic vs. Nomothetic. Philosophical framework: Positivism: Pragmatism, Phenomenology**,** Evolution of modern tools and models in geography**,**Development of geography in Pakistan.

Lab. Work: Writing of assignments and construction of maps relating to geographical thought and seminar presentation.

Course Outcome: At the end of the course, students will be able to:

1. Understand Evolution of modern tools and models in geography**,** Development of geography in Pakistan.

Books Recommended:

1. Cresswell, T. (2024). Geographic Thought: A Critical Introduction. United Kingdom: Wiley.
2. GEOGRAPHICAL THOUGHT : A CONTEXTUAL HISTORY OF IDEAS. (2018). (n.p.): PHI Learning Pvt. Ltd..
3. Dikshit, R. D. (2018). Geographical Thought: A Contextual History of Ideas. India: Prentice Hall India Pvt., Limited.
4. Santos, M. (2021). For a New Geography. United States: University of Minnesota Press.
5. Ye, C. (2024). Exploring New Methods for Teaching and Learning Human Geography. Singapore: Springer Nature Singapore.
6. Thinking Russia's History Environmentally. (2023). United Kingdom: Berghahn Books.
7. Methodological Approaches in Integrated Geography. (2023). Germany: Springer International Publishing.
8. Creswell, T. (2013) Geographic Thought: A critical Introduction, Wiley- Blackwell, Oxford.
9. George Henderson (2008) "Geographic Thought: A Praxis Perspective", Rutledge.
10. Royal Geographical Society. History retrieved 10 January 2014.

DETAILED COURSE OUTLINE OF BS 4 YEARS DEGREE IN GEOGRAPHY SESSION 2023 AND ONWARDS

SEMESTER – IV

Course Title: Civics and Community Engagement.	**Course Code:** PSC-418
Course Structure: Lectures: 2	**Credit Hours:** 2
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Title: Quantitative Reasoning II	**Course Code:** MTH-402
Course Structure: Lectures:3	**Credit Hours:** 3
➢ Course Content will be taken from the booklet of Mandatory Courses of General Education.	

Course Name: Land Surveying	**Course Code:** GEOG-421
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)
Course Objectives: To train students in different surveying techniques.	
Course Outline : This course introduces the concepts of Instrumental survey and records**,** Surveying using the following instruments: Chain survey**,** Plane Table**,** Prismatic Compass**,** Determination of heights and slopes with Abney Level**,** Contouring by Indian Clinometer**,** Use of Dumpy level and Theodolite**,** Total station**,** 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.	
Course outcome: At the end of the course, students will be able to: 1. Understand about surveying and using of surveying instruments.	
Recommended Books 1. J. Paul Guyer, P.E., R.A.(2023) An Introduction to Land Surveying for Professional Engineers. Guyer Partners. 2. Gillespie, W. M. (2023). A Treatise on Land-Surveying. United Kingdom: Outlook Verlag. 3. de Carvalho Alves, M., Sanches, L. (2022). Surveying with Geomatics and R. United States: CRC Press. 4. Ogaja, C., Adero, N., Koome, D. (2023). Project Design for Geomatics Engineers and Surveyors, Second Edition. United States: CRC Press. 5. Soft, J. (2019). Land Surveyor Work Log Book: Land Surveyor Reference & Manual Journal Land Survey Recording Organizer for Measurement, Quantification Point Fields, Distance, Three Dimensional and Many More. (n.p.): Independently Published. 6. Walmisley, A. T. (2018). Land Surveying and Levelling. United States: Creative Media Partners, LLC. 7. Nadolinets, L., Levin, E., Akhmedov, D. (2019). Surveying Instruments and Technology. United Kingdom: Taylor & Francis Group.	

8. Hodgman, F. (2017). A Manual of Land Surveying: Comprising an Elementary Course of Practice with Instruments and a Treatise Upon the Survey of Public and Private Lands,. United States: Fb&c Limited.
9. Underhill, J. (2017). Mineral Land Surveying. (n.p.): Trieste Publishing Pty Limited.
10. Guyer, J. P. (2018). An Introduction to Land and Facilities Surveying. (n.p.): Amazon Digital Services LLC - KDP Print US.
11. Kanungo, A. (2018). The Land Surveying: Law, Practice & Procedure. India: Eastern Law House.

Course Name: Fundamentals of Cartography	**Course Code:** GEOG-422
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

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

Course Outline: This course introduces the evolution of Cartography **,** Basic geodesy, spherical, ellipsoidal and geoidal earth, geographical and planer coordinates, properties of the graticule and geodetic position. Map projections: Major types, merits and demerits of commonly used map projections. Map Datum, Symbolization, symbol types and graphic variables, the symbolization problems, symbolizing graphic features. Lettering principles. Mapping statistical surfaces: Thematic map, choropleth, dot map, isolines, area cartograms. Principles of cartographic design, general design problems; design of map symbols. Basic procedure and designing of the thematic maps such as topographic, climatic, economic, population, settlements, urban morphology etc. Map production, form of map output.
Lab. Work: Drawing of various thematic maps and other relevant exercises in cartography and mapping.

Course Outcome: At the end of the course, students will be able to:

1. Understand about evolution of cartography, spherical, ellipsoidal and geoidal earth, geographical and planer coordinates, properties of the graticule and geodetic position.

Recommended Books:

1. Slocum, T. A., McMaster, R. B., Kessler, F. C., Howard, H. H. (2022). Thematic Cartography and Geovisualization: International Student Edition. United States: CRC Press.
2. David J. Bodenhamer, John Corrigan, Trevor M. Harris(2023) Making Deep Maps Foundations, Approaches, and Methods. Routledge
3. Holloway, P. (2023). Understanding GIS Through Sustainable Development Goals: Case Studies with QGIS. United States: CRC Press.
4. Kraak, M., Ormeling, F. (2021). Cartography: Visualization of Geospatial Data. United Kingdom: CRC Press, Taylor & Francis Group.
5. Ana Josselinne Alegre-Mondragón, Daniela Alejandra Moctezuma-Ochoa, Hugo Carlos-Martinez, Rodrigo Tapia-McClung(2023) Recent Developments in Geospatial Information Sciences. Springer Nature Switzerland.
6. Peterson, G. N. (2023). GIS Cartography: A Guide to Effective Map Design. United Kingdom: CRC Press.
7. Anonymous. (2023). Brown's New Guide-Book and Map for Boston. (n.p.): Anatiposi Verlag.
8. Mike Duggan, Phil Cohen(2021) New Directions in Radical Cartography Why the Map is Never the Territory, Rowman & Littlefield Publishers

Course Name: Geography of Natural Hazards & Disasters	**Course Code:** GEOG-423
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives: The course objectives are;

1. To figure out the geomorphic processes.
2. To interlink the geomorphic processes with natural hazards.
3. To explore the mechanism of natural hazards occurring.

Course Outline: This course introduces the Scientific Method and Principles of Science, Universe, Solar System, Earth Concept of Time, Space, Scale, Matter, Energy, Form and Geomorphic Processes,Spheres of the Earth (Litho, Hydro, Bio and Atmosphere), Plate Tectonics,Earth Heat Budget System, Earth Albedo,Green House Effects, Gaseous Cycles,Eco-Systems, Food Chain and Energy Chain, Hydro-meteorological System,Weather and Climate, Natural Hazards, Geo-hazards, Hydro-meteorological Hazards.

Course Outcomes: : At the end of the course, students will be able to:

1. Understand Scientific Method and Principles of Science, Universe, Solar System,

Recommended Books

1. Alcántara-Ayala, I., Gomez, C., Chmutina, K., van Niekerk, D., Raju, E., Marchezini, V., Rom Cadag, J., Gaillard, J. (2022). Disaster Risk. United Kingdom: Taylor & Francis**.**
2. Mohammad Mokhtari(2023) Natural Hazards New Insights, IntechOpen
3. Narayan Chandra Jana, R. B. Singh(2022) Climate, Environment and Disaster in Developing Countries, Springer Nature Singapore
4. Ana Malheiro, Helder I. Chaminé, Francisco Fernandes(2023) Advances in Natural Hazards and Volcanic Risks: Shaping a Sustainable Future ,Springer Nature Switzerland
5. Ehsan Noroozinejad Farsangi(2021) Natural Hazards Impacts, Adjustments and Resilience, IntechOpen
6. Anna Lukasiewicz, Tayanah O'Donnell(2022) Complex Disasters Compounding, Cascading, and Protracted, Springer Nature Singapore
7. Gowhar Meraj, Mahendra Singh Nathawat, Majid Farooq, Shruti Kanga, Suraj Kumar Singh(2022) Disaster Management in the Complex Himalayan Terrains Natural Hazard Management, Methodologies and Policy Implications ,Springer International Publishing.

Course Title: Biodiversity of Animal Life	**Course Code: ZOL-302**
Course Structure: Lectures: 2, Labs: 1	**Credit Hours: 3**
Prerequisites: None	

Course Objective: The objectives of the course are:

1.To provide the knowledge of evolutionary/phylogenetic relationship (from simple to the complex organisms).

2.To impart the basic taxonomic characteristics and classification of all the invertebrate phyla.

3.To provide understanding of body organization, Feeding and Digestive system; Other Organ System.

Course Outline: This course introduces the classification of animal kingdom, Definition of classification, Major division invertebrates and vertebrates; Classification of invertebrates. Phylum protozoa including general features, classification of Ameoba, Paramecium, Volvox and chlamydomonas. Phylum Porifera; some general features, classification including important species; Sycon, Spongilla, Euplectella, Spongia. Phylum Coelentrates; some general features, Classification including important species; Hydra, Obelia, Physalia, Aurilaaurita, Metridium. Phylum Platyhelminthes; some general features, classification including Planaria, Liver fluke and tapeworm. Phylum Aschelminthes; some general features, classification upto orders. Classes; 1. Gastrotricha, 2. Rotifera, 3.Nematoda with examples. Phylum Annelida; general features, classification: Class Polychaeta, Class Oligochaeta, Class Hirudinea. Phylum Mollusca; general features, classification: classes; 1. Amphineura, 2.gastropoda,3. Pelecypoda,4.Scaphopoda, 5. Cephalopoda. Phylum Arthropoda: some general features, classification: Class Crustaceans, Class Insecta, Class Chilopoda, Class Diplopoda, Class Arachnids with examples. Phylum Echinodermata (General features; classification).

Course Outcomes: Upon successful completion of this course, the students will be able to:

1. Acquire the basic concepts of invertebrates with explanation of evolutionary origin and diversification.
2. Understand invertebrate organismal concepts in laboratory and field.
3. Demonstrate major evolutionary innovations for invertebrates with functional importance.

Practical:

Study of Ameoba, Paramecium, Volvox and chlamydomonas 2.

Study of representatives of classes of Phylum Porifera.

Study of principal representatives of classes of Phylum Coelenterate.

Study of principal representatives of classes of Phylum Platyhelminthes.

Study of representatives of phylum Rotifer, Phylum Nematode.

Study of principal representatives of classes of Phylum Mollusca.

Study of principal representatives of classes of Phylum Annelida.

Study of principal representatives of classes of groups of Phylum Arthropoda • Study of representatives of classes of phylum Echinodermta.

Recommended Books:

1. Schierwater, B. and DeSalle, R., Invertebrate zoology: A tree of life approach. 2021. CRC press.

2.DeSalle, R. and Schierwater, B., Invertebrates And Information. 2021. Invertebrate Zoology: A Tree of Life Approach, p.9.

3.Ray, S., Diarte-Plata, G. and Escamilla-Montes, R. Invertebrates: Ecophysiology and Management. eds., 2020. BoD–Books on Demand.

4.Hickman, C.P., Roberts, L.C/, AND Larson, A., Integrated Principles of Zoology, 15th Edition (International), 2018. Singapore: McGRAW Hill.

5.Pechenik, J.A., BIOLOGY OF INVERTEBRATES, 7th Edition, 2015. (International), Singapore: McGraw Hill.

Kotpal, R.L., Modern text book of Zoology: Invertebrates. 2012. Rastogi Publications.

DETAILED COURSE OUTLINE OF BS 4 YEARS DEGREE IN GEOGRAPHY SESSION 2023 AND ONWARDS

SEMESTER – V

Course Name: Geomorphology	**Course Code:** GEOG-511
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Objective: To make students understand the origin and recognize different types of landform with the help of shape, material and process.

Course Outline: This course introduces the scope and status of geomorphology**,** Introduction to geomorphic concepts/principles**,** Factors of landform development; structure, process and geological time scale**,**EndogenicProcesses**,**Isostasy**,**Diastrophism**,**Continentaldrift**,**Plate tectonic**,** Volcanism**,** Earthquakes**,** Exogenic Processes**,** Weathering; mass wasting and their types**,** Cycle of erosion: fluvial , glacial, eolian and Karst **,**Fluvial erosional landforms, transportation mechanisms of running water; fluvial depositional landforms, types of drainage patterns and structure**,** Glacier formation, glacier as geomorphic agent: glacial erosion and depositional landforms; glacio-lacustrine and glacio-fluvial features**,** Eolian landforms: wind as geomorphic agent; eolian erosional landforms, transportation by wind; Eolian depositional landforms**,** Ground water: porosity and permeability of rocks; aquifers**,** Karst topography and associated landforms**,** Sea wave as geomorphic agent; erosional and depositional landforms**,** 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, use of Remote sensing techniques for the interpretation of landforms and geomorphic features

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

Course Outcome: At the end of the course, students will be able to:
1. Understand about Geomorphology **:**Scope and status of geomorphology**,** Introduction to geomorphic concepts/principles**,** Factors of landform development.

Recommended Books

1. Amjad Kallel, Anna Travé, Broder Merkel,(2024) Selected Studies in Geomorphology, Sedimentology, and Geochemistry, Springer Nature Switzerland
2. Amjad Kallel, Attila Çiner, Imran Ali,(2023) Recent Research on Environmental Earth Sciences, Geomorphology, Soil Science, Paleoclimate, and Karst, Springer Nature Switzerland
3. Alistair Pitty (2020)Themes in Geomorphology. United Kingdom: Taylor & Francis Group.
4. Attila Çiner, André Michard, Helder I(2022) Recent Research on Geomorphology, Sedimentology, Marine Geosciences and Geochemistry, Springer International Publishing
5. Gregory A. Pope, John F. Shroder (2022)Treatise on Geomorphology: Weathering and soil processes. United Kingdom: Elsevier.
6. Davies, T. R., Korup, O., Clague, J. J. (2021). Geomorphology and Natural Hazards: Understanding Landscape Change for Disaster Mitigation. United Kingdom: Wiley.

7. Irasema Alcántara-Ayala, David Huntley, Kyoji Sassa, (2023)Progress in Landslide Research and Technology, Volume 2 Issue 1, 2023. (2023). United States: Springer Nature Switzerland.

Course Name: Climatology	**Course Code:** GEOG-512
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives:

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

Course Outline: This course introduces the key concepts in climatology and meteorology. Structure and composition of atmosphere. Elements and factors of climate. Insolation and Terrestrial heat budget.Temperature distribution. Humidity and its types; Condensation and their forms, Precipitation, formation and their types. Atmospheric Pressure and global pressure belts. Atmospheric Circulation: (Upper and Lower) air stability and instability,storms; Cyclones (hurricanes, typhoons) and tornadoes.Air masses and fronts. Classification of climates; critical study of the Koppen, Miller and Thornthwaite classifications of major climates.Climate variability and climate change: Natural and anthropogenic;Green house gasses; global warming; acid rain, ozone layer depletion **,**El-Niño and La-Niña, impact on precipitation distribution.Climatic regions of Pakistan and their characteristics **,**Climatic data: sources, collection, analysis and presentation.Problems associated with data quality (spatial, temporal).

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

Course Outcomes: At the end of the course, students will be able to:

1. Understand about key concepts in climatology and meteorology. Structure and composition of atmosphere. Elements and factors of climate.

Recommended Books

1. Gates, B. (2021). How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need. United States: Knopf Doubleday Publishing Group.
2. Arthur Zakinyan, Robert Zakinyan (2022)Physics of the Atmosphere, Climatology and Environmental Monitoring: Modern Problems of Atmospheric Physics, Climatology and Environmental Monitoring. Germany: Springer International Publishing.
3. A. Pier Siebesma, Bjorn Stevens, Christian Jakob, Sandrine Bony (2020)Clouds and Climate: Climate Science's Greatest Challenge. India: Cambridge University Press.
4. Ali Cemal Benim, Amjad Kallel, Broder Merkel (2023). Selected Studies in Environmental Geosciences and Hydrogeosciences: Proceedings of the 3rd Conference of the Arabian Journal of Geosciences (CAJG-3). Germany: Springer Nature Switzerland.
5. Shuguang Wang, Yang Zeng(2024)Environmental Science and Technology: Sustainable Development II. United States: Springer Nature Switzerland.
6. Trenberth, K. E. (2022). The Changing Flow of Energy Through the Climate System. United Kingdom: Cambridge University Press.

7. Yohe, G., Jacoby, H., Richels, R., Santer, B. (2023). Responding to the Climate Threat: Essays on Humanity's Greatest Challenge. Germany: Springer International Publishing.
8. DelSole, T., Tippett, M. (2022). Statistical Methods for Climate Scientists. United Kingdom: Cambridge University Press.

Course Name: Oceanography	**Course Code:** GEOG-513
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

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

Course Outline: This course introduces the origin of oceans and seas: major water masses and their distribution.Morphology of the ocean basins. **,**Ocean floor deposits, their characteristics and classification. Temperature, salinity and density of ocean water; distribution, causes and effects**,**Oceanic circulation: waves, currents and tides, their nature, causes,effects and impact on environment. Special phenomena: tropical storms; Tsunami. 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.

Course Outcome:

At the end of the course, students will be able to:

1. Understand about Introduction**,** Origin of oceans and seas: major water masses and their distribution

Recommended Books:

1. Karnauskas, K. (2020). Physical Oceanography and Climate. India: Cambridge University Press.
2. Elizabeth Royer, Julie D Rosati, Ping Wang (2023)Proceedings Of The Coastal Sediments 2023, The (In 5 Volumes).Singapore: World Scientific Publishing Company.
3. Hill, T., Simons, E. (2024). At Every Depth: Our Growing Knowledge of the Changing Oceans. United States: Columbia University Press.
4. Garrison, A. (2021). Oceanography Textbook: Essentials of Marine Science. (n.p.): Amazon Digital Services LLC - KDP Print US.
5. Helmreich, S. (2023). Alien Ocean: Anthropological Voyages in Microbial Seas. United States: University of California Press.
6. Gregg, M. C. (2021). Ocean Mixing. India: Cambridge University Press.
7. Czerski, H. (2024). The Blue Machine: How the Ocean Works. United States: W. W. Norton.
8. Stanev, E. (2023). Trajectories in Oceanography. Germany: Springer Nature Switzerland.

Course Name: Economic Geography	**Course Code:** GEOG-514
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives: To create an understanding of Spatial variations of Economic resources and activities with reference to global and national scenarios.

Course Outline: This course introduces the **e**volution of world economic systems: Medieval feudal economics, economic impacts of colonialism. Modern world economic systems**,**Concept of natural resources and reserves**,**Human resource and its development **,** Classification of economic activities**,** Primary activities; gathering, hunting, herding, subsistence, Intensive and extensive farming, commercial grain farming, livestock farming, dairying, mixed farming, plantation farming, lumbering, fishing and mining**,**Green revolution and its implications**,**Secondary activities: Industrial revolution and manufacturing industries**,**Tertiary activities**,**Trade and service functions**,**Transport systems. Quaternary and Quinary activities**,**Regional inequalities, sustainable development and poverty alleviation**,**Impacts of Globalization

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

Course Outcome: At the end of the course, students will be able to:

1. Understand about Introduction and evolution of world economic systems.

Recommended Books

1. Jovanović, M. N. (2020). Evolutionary Spatial Economics: Understanding Economic Geography and Location Over Time. Germany: Edward Elgar Publishing.
2. R. N. Chauhan (2020)Basic Principles of Economic Geography. India: ABD Publishers.
3. Jennifer Johns, Sarah Marie Hall (2024)Contemporary Economic Geographies: Inspiring, Critical and Plural Perspectives. United Kingdom: Bristol University Press.
4. Marijn Molema, Sara Svensson (2021)Regional Economic Development and History. United Kingdom: Taylor & Francis Group.
5. Martin Franz, Philip Verfurth, Thomas Neise (2024)The Changing Economic Geography of Companies and Regions in Times of Risk, Uncertainty and Crisis. United Kingdom: Taylor & Francis Limited.
6. Dieter Kogler(2017)Evolutionary Economic Geography: Theoretical and Empirical Progress.United Kingdom: Routledge.
7. Dr. B. Prabhu Dass Batvari (2023) Physical, Human And Economic Geography (n.p.): Academic Guru Publishing House.
8. Sabry, F. (2023). Economic Geography: Exploring the Global Landscape of Prosperity, a Comprehensive Guide to Economic Geography. (n.p.): One Billion Knowledgeable.

Course Name: Quantitative Geography	**Course Code:** GEOG-515
Course Structure: Lecture 3	**Credit Hours:** 3(2+1)

Course Objective:

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

Course Outline: This course introduces students to Quantitative Geography,Quantitative revolution and its impact on Geography, Parametric and non-parametric statistics,Nature of geographical data and measurement

scales.Data summarizing techniques: theory of central tendency, dispersion, and variability.Time Series: graphs, growth and decline, index numbers, logarithmic scales, trends and fluctuations, components of time series.Methods of drawing trend lines for linear and exponential series scatter diagrams, standard errors and probability, correlation and regression.Quantitative models in Geography.
Lab. work: Introduction to EPI-Info SPSS E-view, MS Excel, MiniTab and other relevant software database for quantitative analysis.

Course Outcomes:

At the end of the course, students will be able to:

1. Understand the nature of Geographical Data.

2. Comprehend the key concepts of MS Excel, SPSS, regression, probability..

Recommended Books:

1. Meghan Cope, Nicholas Clifford, Thomas Gillespie (2023)Key Methods in Geography. United Kingdom: SAGE Publications.
2. Rey, S., Arribas-Bel, D., Wolf, L. J. (2023). Geographic Data Science with Python. United States: CRC Press.
3. Cresswell, T. (2024). Geographic Thought: A Critical Introduction. United Kingdom: Wiley.
4. Yeung, H. W. (2023). Theory and Explanation in Geography. United Kingdom: Wiley.
5. Grekousis, G. (2020). Spatial Analysis Methods and Practice: Describe - Explore - Explain Through GIS. India: Cambridge University Press.
6. Wang, F., Liu, L. (2023). Computational Methods and GIS Applications in Social Science. United States: CRC Press.
7. Esteban-Bravo, M., Vidal-Sanz, J. M. (2021). Marketing Research Methods: Quantitative and Qualitative Approaches. India: Cambridge University Press.
8. Walford, N. (2011) Practical Statistics for Geographers and earth Science,Wiley- Blackwell, Singapore.
9. Fischer, Manfred M., and Arthur Getis, eds. Handbook of Applied Spatial Analysis: Software Tools, Methods, and Applications. Berlin: Springer, 2010.

Course Name: Settlement Geography	**Course Code:**GEOG-516
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives:

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

Course Outline: This course introduces the **s**ignificance of settlement geography, basic definitions: Site and situation, hierarchy and types of settlements**.** Rural settlements: Dispersed settlements, nucleated and ribbon settlements; their contrasts between More Developed Countries(MDCs) and Less Developed Countries (LDCs). Forms and patterns of settlements, house types and their evolution in rural areas**.** Commercial functions of rural settlements and their role as a market town**.** Infrastructure and services in rural settlements. Historical evolution of urban settlements, rural-urban fringe, suburbs and satellites**.** Economic base, urban function and functional classification**.** Towns and villages as central places**.** Internal structure of the cities and

land use pattern**.** Theories of urban structure: Central place theory, Sector theory, and social area analysis, Urban development: slums and blighted areas. 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.

Course Outcomes:

On the completion of this course, the students would be able to

1.Comprehend the establishment and development of human settlements in addition to the process of urbanization, and other related issues of settlements in the developed and developing worlds.

2. Acquire the basic concepts of More Developed Countries(MDCs) and Less Developed Countries (LDCs).

Recommended Books

1. Settlement Geography: Rural and Urban Settlements. (2020). India: Pravalika Publications.
2. Mitchell, R. E. (2018). Human Geographies Within the Pale of Settlement: Order and Disorder During the Eighteenth and Nineteenth Centuries. Germany: Springer International Publishing.
3. Howell, I. (2018). Population and Settlement Geo Facts. United States: Crabtree Publishing Company.
4. Twentieth Century Land Settlement Schemes. (2020). United Kingdom: Taylor & Francis Limited (Sales).
5. Roberts, B. K. (2023). Rural Settlement in Britain. United Kingdom: Taylor & Francis.
6. Roy, R. (2016). Settlement Geography. India: Centrum Press.
7. Sinha, V. N. P., Verma, U., Sahay, A. (2017). Introduction to Settlement Geography. India: Rajesh Publications.
8. Finlayson, C. (2019). World Regional Geography. (n.p.): Independently Published.
9. Cities of the World: Regional Patterns and Urban Environments. (2020). United Kingdom: Rowman & Littlefield Publishers.
10. Bunce, M. (2017). Rural Settlement in an Urban World. United Kingdom: Taylor & Francis.
11. Roy, R. (2016). Settlement Geography. India: Centrum Press.
12. Raghavan, K. M. (2014). Emerging Frontiers of Urban Settlement Geography. India: Navyug Books International..

Course Title: Cell biology		**Course Code:** BIT-303
Course Structure: Lecture. 2 Lab. 1		**Credit hours:** 3
Pre-requisite	None	

Course Objectives

This course provides the basic concepts of life science,

1. With emphasis on the diversity of life, the physical and chemical nature of living matter, and the form and function of cells and organisms.
2. Introduce students to the internal organization of the prokaryotic and eukaryotic cell, organelle and membrane function, cell-cell signaling, cell movement, cell adhesion, and the extracellular matrix.

Course Outline: Introduction to cell biology, Form and function of the cell, Types of cells, The Chemical Basis of Life, the chemistry of cell, Cells and organelles overview, The Structure, function, and molecular organization of cellular organelles, Roles of different macromolecules, Enzymes Molecular organization of cells Protoplasm, Cell wall, Cell membrane, transport across membranes, organelles: mitochondria, endoplasmic reticulum, Golgi bodies, plastids, lysosomes, peroxisomes, The Structure and Function of the Plasma Membrane, Cytoplasmic Membrane Systems, cell internal structure, cytoskeleton, microtubules, microfilaments, intermediate filaments, structure of chromosomes, Photosynthesis, Components of Photosynthesis, cell division and cell cycle. The key roles of mitosis and meiosis during the life cycle. Compare and contrast different life cycle strategies, focusing on the human life cycle 13 Stages of mitosis and meiosis, Highlighting similarities and differences. Stages of the cell cycle Apoptosis, cell signaling, Cell visualization techniques.

Course Outcomes

Upon completion of this course, students will be able to:

1. Acquire the basic concepts of cell biology.
2. Understand the metabolic processes of cells in terms of cellular organelles, membranes, and biological molecules.
3. Ability to understand the role of macromolecules regulating cellular processes.
4. Formulate the critical thinking skills and knowledge on cell.

Lab outlines: Microscopy and staining techniques; study of prokaryotic, eukaryotic, plant and animal cells; cell structure in the staminal hair of Tradescantia; study of different types of plastids; cellular reproduction; Mitosis: smear/squash preparation of onion roots.

Books Recommended

1. Thomas D. Pollard, MD, William C. Earnshaw, PhD, FRS, Jennifer Lippincott-Schwartz, PhD and Graham Johnson, Cell Biology, 4th Edition (2023) ISBN : 9780323758000
2. Bruce Alberts, Rebecca Heald, Alexander Johnson, Molecular Biology of the Cell 7th Edition, 2022. W.W.Norton and Company.
3. Harvey Lodish, Arnold Berk, Chris A. Kaiser- 2016 8th Edition Molecular cell biology
4. Alberts et al., 2009. Essential Cell Biology. 3rd Edition; Garland Publishers, New York.
5. Lodish et al,. 2007. Molecular Cell Biology. 6th Edition; Freeman and Company, New York. (available at www.ncbi.nlm.nih.gov)
6. Thomas D. Pollard, William C. Earnshaw, Jennifer Lippincott-Schwartz 2007 2nd Edition Cell biology
7. Alberts B and Johnson A, 2006. Molecular Biology of the Cell. 4 th Edition; Garland Publishers, New York. (available at www.ncbi.nlm.nih.gov)
8. S C Rastogi 2005 3rd Edition, Cell biology. Newage international Publishers.India.
9. Karp, 2002. Cell and Molecular Biology. 3rd Edition; John Wiley and Sons, New York.

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

ETAILED COURSE OUTLINE OF BS 4 YEARS DEGREE IN GEOGRAPHY SESSION 2023 AND ONWARDS

SEMESTER – VI

Course Name: : Political Geography	**Course Code:** GEOG-521
Course Structure: Lecture 3	**Credit Hours:** 3(2+1)

Course Objective:

1. To highlight the political phenomena in geographical context.
2. To explore the geographical aspect in the emergence and growth of states, frontier and boundaries
3. To analyze and highlight the problem of Spatial and contemporary Political/Administrative Institutions and development.

Course Outline: This course introduces the scope and Status of Political Geography. Perceptions of Space, Territoriality and the Political World. The State: State, Nation, nation-State. The Emergence of States. Modern Theories about states. The Territory of the State. Frontiers and Boundaries. Core Areas and capitals. Unitary, Federal and Regional States. Anomalous Political Units. Power Analysis. Political Geography within the State: Internal functions of the state. Constituent parts of the state. Civil divisions and districts with special reference to the context of Pakistan. Geopolitics: Historical concepts in Geopolitics. Contemporary Geopolitics. Contemporary International Relations: International Law. International Trade. Land-locked States. Intergovernmental Organizations. The Political Geography of the Sea. Politics of population, Migration and Food. The Role of Political Geographers in the Future Outer Space.

Course Outcomes:

1. To analyze the key concept of spatial and contemporary political/ administrative institutions and development

Recommended Books:

1. Fawcett, C. b. (2023). Frontiers, a Study in Political Geography. United States: Creative Media Partners, LLC.
2. Squire, R., Jackman, A. (2023). Political Geography: Approaches, Concepts, Futures. India: Sage.
3. Terlouw, K. (2022). Political Geography of Cities and Regions: Changing Legitimacy and Identity. United Kingdom: Taylor & Francis.
4. Bolgov, R. (2021). Proceedings of Topical Issues in International Political Geography. (n.p.): Springer International Publishing.
5. Flint, C., Taylor, P. J. (2018). Political Geography: World-Economy, Nation-State and Locality. United Kingdom: Taylor & Francis.
6. Gallaher, C., Dahlman, C. T., Gilmartin, M. (2009). Key Concepts in Political Geography. United Kingdom: SAGE.
7. Prescott, J. R. V. (2016). Political Frontiers and Boundaries (Routledge Library Editions: Political Geography). United Kingdom: Routledge.
8. WEIGERT, H. W. (2018). PRINCIPLES OF POLITICAL GEOGRAPHY. (n.p.): FORGOTTEN BOOKS.
9. Minghi, J. (2017). The Structure of Political Geography. United Kingdom: Taylor & Francis Group.
10. Parker, G. (2014). Western Geopolitical Thought in the Twentieth Century. United Kingdom: Taylor & Francis.

Course Name: Environmental Geography	**Course Code:** GEOG-522
Course Structure: Lecture 3	**Credit Hours:** 3(2+1)

Course Objective:

1) To impart basic environmental knowledge to the students.

2) enhance their awareness regarding global and local environmental issues

Course Outline: This course introduces students to the **e**volution of Environmental Studies in Geography. Comparative Advantage of Geography Concept of environmental management Environment and ,Ecosystem, Resources, Important Cycles, Population explosion, The human impact on the environment,Environmental hazards,Types of Hazards,Geophysical, Quasi-Natural ,Biological Technological Human Response Parameters.Risk assessment and perception.Adjustment to HazardsMajor Environmental hazards and Problems in Pakistan,Floods ,Earthquake; Tsunami,Cyclones,Landslides,Droughts,Deforestation and Desertification.Water-logging and Salinity Soil Erosion Global Warming and ozone depletion Environmental Pollution Waste Management Control and Mitigation Measures Technology Awareness Legislation,Pakistan Environmental Act, National Conservation Strategy, National Environmental Quality Standards.

Lab. work: Field visits of urban and rural areas to identify local environmental problems and documentation of these problems through GIS and SRS data.

Course Outcomes:

At the end of the course, students will be able to:

1. Understand the nature of Environmental Studies.

2. Comprehend the key concepts of cycles, population explosion, national conservation strategy, Pakistan Environment Act.

Recommended Books:

1. Perception, Design and Ecology of the Built Environment: A Focus on the Global South. (2020). Germany: Springer International Publishing.
2. Whyte, I. (2013). A Dictionary of Environmental History. United Kingdom: I.B. Tauris.
3. Basak, A. (2009) Environmental Studies, Pearson, New Delhi.
4. Botkin, D. B. & Edward A. K. (2012) Environmental Science, John Wiley & Sons. Inc., Hoboken.
5. Dasgupta, S. (Ed.) (2009) Understanding the Global Environment, Pearson Longman, New Delhi.
6. Botkin, D. B. & Edward A. K. (2012) Environmental Science, John Wiley & Sons. Inc.
7. Weng, Q. (Ed.) (2011) Advances in Environmental Remote Sensing, Taylor and Francis Group.
8. Lead, J. R. & Smith, E. (2009) Environmental and human health impacts of nanotechnology. John Wiley & Sons., New York.
9. Wright, R. T. (2008) Environmental Science, Pearson Prentice Hall, New Delhi
10. Hidden Geographies. (2021). Switzerland: Springer International Publishing.
11. Hansom, J., Gordon, J. (2014). Antarctic Environments and Resources: A Geographical Perspective. United Kingdom: Taylor & Francis.
12. Pakistan's National Conservation Strategy: Renewing Commitment to Action : Report of the Mid-term Review. (2000). Pakistan: Government of Pakistan, Ministry of Environment, Local Government and Rural Development.
13. Bank, A. D., Ahsan, I., Amin Khawaja, S. (2013). Development of Environmental Laws and Jurisprudence in Pakistan. Philippines: Asian Development Bank.
14. Sustainable Development on Water Resources Management, Policy and Governance in a Changing World. (2023). (n.p.): Frontiers Media SA.

Course Name: Geographical Information Science	**Course Code:** GEOG-523

Course Structure: Lecture 3	**Credit Hours:** 3(2+1)

Course Objective:

1. The course aims to equip students with an understanding of GIS
2. evolution and applications of spatial data through Geo-spatial technologies**.**

Course Outline: This course introduces students to the key components, functional subsystem, Raster data model, vector data model, attribute data model, Data acquisition techniques, data sources, data capturing techniques and procedures, data transformation, 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: components of data quality, micro level components, macro level components, usage components, sources of errors, 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 of Topological Errors, Overlay and network analysis

Course Outcomes:

At the end of the course, students will be able to:

1. Understand the nature of GIS

2. Comprehend the key concepts of Map layout, Attribute, spatial data, buffering.

Recommended Books:

1. Shin, M. E., Campbell, J., Burkhart, S. (2022). Essentials of Geographic Information Systems. United States: FlatWorld.
2. Panigrahi, N. (2019). Geographical Information Science. India: CRC Press.
3. Geographical Information Science: Case Studies in Earth and Environmental Monitoring. (2024). Netherlands: Elsevier Science.
4. Pontius Jr, R. G. (2022). Metrics That Make a Difference: How to Analyze Change and Error. Switzerland: Springer International Publishing.
5. Bunch, R., Nelson, J., Nelson, E. (2019). Geographic Information Science: Introductory Concepts and Applications. United States: Kendall Hunt Publishing Company.
6. Geographic Information Systems in Geospatial Intelligence. (2020). United Kingdom: IntechOpen.
7. Burrough, P. A., McDonnell, R. A., Lloyd, C. D. (2015). Principles of Geographical Information Systems. United Kingdom: OUP Oxford.
8. Comprehensive Geographic Information Systems. (2017). Netherlands: Elsevier Science.
9. Onsrud, H., Kuhn, W. (2016). Advancing Geographic Information Science: The Past and Next Twenty Years. United States: GSDI Association Press.
10. Demers, M.N. (2008) Fundamentals of Geographical Information Systems.Fourth Edition. John Wiley & Sons, New Jersey.
11. Heywood, I., Cornelius, S., & Carver, S. (2011) An Introduction to Geographical Information System, Fourth Edition. Prentice Hall, New Jersey.

12. Jensen, J. R. (2006) Remote Sensing of the Environment: An Earth Resource Perspective. Second Edition, Prentice Hall, New Jersey.
13. Kimerling, J., Buckley, A. R., Muehrcke, P. C., & Muehrcke, J. O. (2011) Map Use: Reading, Analysis, Interpretation. Seventh Edition. ESRI Press. USA.
14. Krygier, J., & Wood, D. (2011) Making Maps: A Visual Guide to Map Design for GIS. Second Edition. The Guilford Press, New York.
15. Longley, P. A., Goodchild, M., Maguire, D. J. & Rhind, D. W. (2010)

Course Name: : Remote Sensing and Image Processing	**Course Code:** GEOG-524
Course Structure: Lecture 3	**Credit Hours:** 3(2+1)

Course Objective:

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

Course Outline: This course introduces students to the **h**istory and development Concepts and Foundation of Remote Sensing Electromagnetic spectrum Visible Spectrum Colour Theory Atmospheric Attenuation Types of Remote Sensing Systems Active Remote Sensing Passive Remote Sensing Type of Sensors. RBV, MSS, TM,HRV, HRPT/APT/AVHRR, MODIS (Terra and Aqua) non-imaging systems (RADAR) ,Types of Satellites. Manned Satellites (Gemini, Mercury, Apollo, Space Shuttles. Unmanned Satellites (Metrological, Earth Resources, Telecommunication, Spy, Scientific etc.)Platforms (Orbits)Ground Receiving Stations (Reception of Data)Image Processing Image Classification Image Interpretation Image Interpretation Methods Image Interpretation Elements Image Interpretation Tasks Image Measurements.Global Positioning System (GPS)Applications (Hydrology, Geology, Climatology, Environmental Application, Planning, Agricultural, Forestry, Socio-economic, Health etc.)Remote Sensing in Pakistan: Potential and Prospects

Lab. work: Introduction to labs., single band image interpretation, false color predictions, false color composite images interpretation, visual interpretation of aerial photographs, various sensors data comparison, thermal infrared image interpretation, introduction to ERDAS imagine, display, geo-linking, identification of targets, field trips.

Course Outcomes:

At the end of the course, students will be able to:

1. Understand the nature of Remote Sensing

2. Comprehend the key concepts of Satellites, spac shuttles etc.

Recommended Books:

1. Camps-Valls, G., Tuia, D., Gómez-Chova, L., Jiménez, S., Malo, J. (2022). Remote Sensing Image Processing. Poland: Springer International Publishing.
2. Marghany, M. (2022). Remote Sensing and Image Processing in Mineralogy. United Kingdom: CRC Press, Taylor & Francis Group.
3. Weng, Q. (2020). Remote Sensing Time Series Image Processing. United Kingdom: CRC Press.

4. Mather, P. M., Koch, M. (2022). Computer Processing of Remotely-Sensed Images. United Kingdom: Wiley.
5. de Carvalho Alves, M., Sanches, L. (2023). Remote Sensing and Digital Image Processing with R. United States: CRC Press.
6. Alves, M. d. C., Sanches, L. (2023). Remote Sensing and Digital Image Processing with R - Lab Manual. United States: CRC Press.
7. Liu, J. G., Mason, P. J. (2016). Image Processing and GIS for Remote Sensing: Techniques and Applications. Germany: Wiley.
8. Campbell, J. B. & Wynne, R. H. (2011) Introduction to Remote Sensing. Fifth Edition. Guilford Press, New York..
9. Jensen, J. R. (2011) Remote Sensing of the Environment: An Earth Resource Perspective. Second Edition. Prentice Hall, New Jersey.
10. Weng, Q. (2010) Remote Sensing and GIS Integration: Theories, Methods and applications, McGraw-Hill, New York.

Course Name: Quantitative Geography	**Course Code:** GEOG-525
Course Structure: Lecture 3	**Credit Hours:** 3(2+1)

Course Objective:

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

Course Outline: This course introduces students to Quantitative Geography,Quantitative revolution and its impact on Geography, Parametric and non-parametric statistics,Nature of geographical data and measurement scales.Data summarizing techniques: theory of central tendency, dispersion, and variability.Time Series: graphs, growth and decline, index numbers, logarithmic scales, trends and fluctuations, components of time series.Methods of drawing trend lines for linear and exponential series scatter diagrams, standard errors and probability, correlation and regression.Quantitative models in Geography.
Lab. work: Introduction to EPI-Info SPSS E-view, MS Excel, MiniTab and other relevant software database for quantitative analysis.

Course Outcomes:

At the end of the course, students will be able to:

1. Understand the nature of Geographical Data.

2. Comprehend the key concepts of MS Excel, SPSS, regression, probability..

Recommended Books:

1. Meghan Cope, Nicholas Clifford, Thomas Gillespie (2023)Key Methods in Geography. United Kingdom: SAGE Publications.
2. Rey, S., Arribas-Bel, D., Wolf, L. J. (2023). Geographic Data Science with Python. United States: CRC Press.
3. Cresswell, T. (2024). Geographic Thought: A Critical Introduction. United Kingdom: Wiley.
4. Yeung, H. W. (2023). Theory and Explanation in Geography. United Kingdom: Wiley.

5. Grekousis, G. (2020). Spatial Analysis Methods and Practice: Describe - Explore - Explain Through GIS. India: Cambridge University Press.
6. Wang, F., Liu, L. (2023). Computational Methods and GIS Applications in Social Science. United States: CRC Press.
7. Esteban-Bravo, M., Vidal-Sanz, J. M. (2021). Marketing Research Methods: Quantitative and Qualitative Approaches. India: Cambridge University Press.
8. Walford, N. (2011) Practical Statistics for Geographers and earth Science,Wiley- Blackwell, Singapore.
9. Fischer, Manfred M., and Arthur Getis, eds. Handbook of Applied Spatial Analysis: Software Tools, Methods, and Applications. Berlin: Springer, 2010.

Course Name: : Research Methodology	**Course Code:** GEOG-526
Course Structure: Lecture 3	**Credit Hours:** 3

Course Objective:

1. To create awareness among students regarding basics of geographical Research.

Course Outline:

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

Lab. Work:

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

Course Outcomes:

At the end of the course, students will be able to:

1. develop research aptitude so that they can prepare a project report, Hypothesis and all other steps involved in their organizing research.
2. become Computer Savvy so that they can apply new techniques in their research methodology i.e. GIS, Remote Sensing etc

Recommended Books:

1. Bearman, N. (2020). GIS: Research Methods. United Kingdom: Bloomsbury Publishing.
2. Knight, J., Whalley, B. W. (2020). Research Methods in Physical Geography. United Kingdom: Routledge, Taylor & Francis.

3. Methodological Approaches in Integrated Geography. (2023). (n.p.): Springer International Publishing.
4. Methodological Approaches in Physical Geography. (2022). Switzerland: Springer International Publishing.
5. Rogerson, P. (2019). Statistical Methods for Geography: A Student's Guide. United Kingdom: SAGE Publications.
6. Harris, R. (2016). Quantitative Geography: The Basics. United Kingdom: SAGE Publications.
7. Peters, K. (2017). Your Human Geography Dissertation: Designing, Doing, Delivering. United Kingdom: SAGE Publications.
8. Bridget, S. & Lewin, C. (Ed.) (2012) Theory and Methods in social Research,SAGE, London.
9. Cohen, L., Manion, L. & Morrison, K. (2011) Research Methods inEducation, Routledge Taylor & Francis Group, London.
10. Montello, D. & Sutton, P. (2012) An Introduction to Scientific Research Methods in Geography & Environmental Studies. SAGE Publications,London.
11. Agarwal,Chetan : Research Methodology in Geography (Common Wealth Publishers, New Delhi ,2012)
12. Sharma,Vijay: Research Methodology in Geography (Common Wealth Publishers ,New Delhi, 2014)
13. Murthy,K.L.Narasimha :Research Methodology in Geography (Concept Publishing Company, New Delhi ,2014)

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DETAILED COURSE OUTLINE OF BS 4 YEARS DEGREE IN GEOGRAPHY SESSION 2023 AND ONWARDS

SEMESTER –VII

Course Name: : Internship/Field Experience	**Course Code:** GEOG-698
Course Structure: Lecture 3	**Credit hours:**3

Course Objective:

1. To provide an opportunity for students to obtain supervised experience in applying tier geographic knowledge and skills in the workplace environment.
2. To gain experience and skills in a particular field.

Course Outline: Field experience is an essential component of geography education. It enables students to better understand the "messiness" of "geographical reality", develop subject knowledge, and gain a range of skills that are difficult to develop in the classroom alone. The research project is a major component of the program in which the student will demonstrate an ability to independently integrate knowledge, skills and competencies acquired from all earlier courses, together with an opportunity to consolidate and develop additional skills in the use and application of research methodologies. This independent study will be defined in consultation with the course co-ordinator and will be based on:

A specific research topic brought from the Remote Sensing & GIS industry. In this case, the topic will be discussed and finalized by mutual consultation of the corresponding industry, student and the 4-year BS Geomatics (GIS & RS) course coordinator of the University. A research project proposed by research supervisor or associate researchers within or outside the host university. A development from a guided project pursued in RS and GIS, Applied Remote Sensing or an idea developed by the student during the earlier taught parts of the course. In all cases, there will be a close liaison prior to, and during the project between the student, the course contributors and relevant industry organizations.

Course Outcomes:

Upon successful complete of the internship, students will be able to:

1. Apply academic knowledge to solve practical, real-world problems in a professional setting;

2. Develop and sharpen relevant knowledge, skills, and abilities necessary to serve effectively in a

professional setting.

Course Name: Techniques in Geography	**Course Code:** GEOG-611
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives

1. To introduce students to fundamental geographic concepts
2. To familiarize students with various data collection techniques.

Course Outline: This course gives an introduction to Geographic Techniques,Overview of geographic Concepts ,Geographic Data Sources,Maps and Cartography,Types of Maps, Map Projection, Map Design Principles,Geographic Information System: introduction to GIS, GIS software and Tools,Remote Sensing: Basics of Remote Sensing, Satellite Imagery and Applications,Global Positioning System: Introduction, History of GPS, Components of GPS,Qualitative Research Methods in Geography: interviews and Surveys, Qualitative Data Analysis,GeoSpatial Data Visualization: Data Visualization Techniques, Interactive Mapping Tools ,Geopolitics and Geographical Information: Geopolitical Analysis, Geospatial Intelligence.

Course Outcome: At the end of the course, students will be able to:

1. Understand Scientific Method and Principles of Science, Universe, Solar System.

Recommended Books

1. Maity, S. K. (2021). Essential Graphical Techniques in Geography. Singapore: Springer Nature Singapore.
2. Piovan, S. E. (2021). The Geohistorical Approach: Methods and Applications. (n.p.): Springer International Publishing.
3. Rogerson, P. A. 2020. Statistical methods for geography. 5th ed. London, UK: Sage.
4. Mackinder, H. J. (2020). The Scope and Methods of Geography. United States: Cosimo, Incorporated.
5. Grekousis, G. (2020). Spatial Analysis Methods and Practice: Describe - Explore - Explain Through GIS. India: Cambridge University Press.
6. Ojo, A. (2020). GIS and Machine Learning for Small Area Classifications in Developing Countries. United States: CRC Press.

7. Rogerson, P. A. (2021). Spatial Statistical Methods for Geography. United Kingdom: SAGE Publications.
8. Rogerson, P. (2019). Statistical Methods for Geography: A Student's Guide. United Kingdom: SAGE Publications.
9. Liu, J. G., Mason, P. J. (2016). Image Processing and GIS for Remote Sensing: Techniques and Applications. Germany: Wiley.
10. Samih Ahmed, Basics of Geographic Information Systems, Gis, Amman,Jordan, 2015
11. Jumaa Mohamed Daoud, Foundations and Applications of Remote Sensing,Cairo, Egypt, 2015.
12. Ali Muhammad Rajab, The Uses of Geographical Information Systems, First Edition, Dar Al-Wafaa for Printing, Publishing and Distribution, 2015.
13. Jumaa Muhammad Dawood, Principles of Geographical Information Systems,First Edition, 2015.

Course Name: Geodesy and Satellite Navigation System	**Course Code:** GEOG-612
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives: : This course attempts to provide training on the fundamental aspects of GPS and Geodesy, various GPS measurements, their corresponding accuracies and identification of targets.

Course Contents: This course introduces Geodesy and Navigation System**,**History of Navigation System**,**Navigation working mechanism**.**Components of Navigation System: Space Segment, Control Segment, User Segment **.**Navigation Data, Position and Time , Velocity**,**Errors in Navigation System, Sources of Errors **.**Navigation Satellite Signals, Pseudo-Range Navigation**.**Differential Navigation Techniques**.**Tracking and real time system**.**Navigation Techniques and Project Costs

Lab Work: Navigation value reading, Easting Northing & elevation, Map Projections and Datum Settings, Navigation based surveys, tracking, navigation and data processing, Navigation Project.

Course outcomes: At the end of the course, students will be able to:

1. Understand the fundamental aspects of GPS and Geodesy
2. Comprehend the key concepts of Navigation System

Recommended Books

1. Jekeli, C. (2023). Inertial Navigation Systems with Geodetic Applications. Germany: De Gruyter.
2. Torge, W., Müller, J., Pail, R. (2023). Geodesy. Austria: De Gruyter.
3. Van Sickle, J. (2023). GPS and GNSS for Land Surveyors, Fifth Edition. (n.p.): CRC Press.
4. Ogaja, C. A. (2022). Introduction to GNSS Geodesy: Foundations of Precise Positioning Using Global Navigation Satellite Systems. Switzerland: Springer International Publishing.
5. Bhatta, B. (2021). Global Navigation Satellite Systems: New Technologies and Applications. United Kingdom: CRC Press.
6. Springer Handbook of Global Navigation Satellite Systems. (2021). Switzerland: Springer International Publishing.
7. Geng, J. (2022). GNSS SEISMOGEODESY: Theory and Applications. Netherlands: Elsevier Science.
8. Angermann, D., Pail, R., Seitz, F., Hugentobler, U., Hein, G. W., Lesch, H., Rahmstorf, S. (2022). Mi ssion Earth: Geodynamics and Climate Change Observed Through Satellite Geodesy. Germany: Springer Berlin Heidelberg.
9. Hofmann-Wellenhof, B., Lichtenegger, H., Collins, J. (2012). Global Positioning System: Theory and Practice. Austria: Springer Vienna.
10. Preiss, W. J. & Zubinaite, V. (2014) An Introduction to GNSS Processing Concepts

11. Hofmann-Wellenhof, B., Lichtenegger, H. & Wasle, E. (2008) GNSS - Global Navigation Satellite Systems: GPS, GLONASS, Galileo, and more
12. GPS for Land Surveyors (Fourth Edition) by Jan Van Sickle, 2015
13. Global Positioning System: Signals, Measurements, and Performance (Second Edition) by Pratap Misra and Per Enge, 2010
14. Introduction to GPS: The Global Positioning System (Second Edition) by Ahmed El-Rabbany, 2006

Course Name: Major (elective) XXIII	**Course Code:**
Course Structure: Lectures:3	**Credit Hours:** **3**(2+1)
➢ Major Elective can be selected from elective subjects list subject to the availability of the teacher	

Course Name: Major(elective)XXIV	**Course Code:**
Course Structure: Lectures:3	**Credit Hours:** **3**(2+1)
➢ Major Elective can be selected from elective subjects list subject to the availability of the teacher	

SHAHEED BENAZIR BHUTTO WOMEN UNIVERSITY PESHAWAR

DETAILED COURSE OUTLINE OF BS 4 YEARS DEGREE IN GEOGRAPHY SESSION 2023 AND ONWARDS

SEMESTER –VIII

Course Name: Region & Regional Concept	**Course Code:** GEOG-621
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)
Objectives: 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 level**.**	
Course Contents: This course introduces regional Concepts,Scope, Status, and the significance of the regional approach**.**Regional approach and its evolution**.**Criteria for dividing world into regions**.**Physical Attributes: Location, Physiography, Climate, Soils, Hydrologyand Natural Vegetation**.**Economic attributes: Human Resources, Mineral and Power esources,Agriculture, Industry, Communication and Trade**.**Types of Regions**.**Physical Regions**.**Economic Regions**,**Political Regions**.**Cultural Regions**,**Special Purpose Regions**,**Major Regions of the world**,**Distinguishing characteristics**,**South Asia**,**South West Asia**,**Far-eastern regions**,**Western Europe**,**Russia and Central Asia**,**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	
Course outcome: At the end of the course, students will be able to: 1. Understand the fundamental aspects of regions 2. Comprehend the key concepts of political regions	
Recommended Books	

1. Nijman, J., Shin, M., Muller, P. O. (2020). Geography: Realms, Regions, and Concepts. United States: Wiley.
2. B. Haas, E. (2020). Uniting of Europe: Political, Social, and Economic Forces, 1950-1957. United States: University of Notre Dame Press.
3. Gendered Lives: Global Issues. (2022). United States: State University of New York Press.
4. Hudson, J. C. (2020). Across This Land: A Regional Geography of the United States and Canada. United States: Johns Hopkins University Press.
5. Finlayson, C. (2019). World Regional Geography. (n.p.): Independently Published.
6. Mishkova, D. (2020). Beyond Balkanism: The Scholarly Politics of Region Making. United Kingdom: Routledge.
7. Morrison, A. (2021). The Russian Conquest of Central Asia: A Study in Imperial Expansion, 1814-1914. India: Cambridge University Press.
8. Huff, G. (2020). World War II and Southeast Asia: Economy and Society Under Japanese Occupation. India: Cambridge University Press.
9. Oceanic Histories. (2018). India: Cambridge University Press.
10. Nijman, J., Muller, P. O., de Blij, H. J. (2016). The World Today: Concepts and Regions in Geography. United States: Wiley.
11. Johnston, R., Sidaway, J. D. (2015). Geography and Geographers: Anglo-American Human Geography Since 1945. United Kingdom: Taylor & Francis.
12. Adhikari, S. 2016. Fundamentals of Geographical Thought, New Delhi: Orient Black Swan Publications
13. Contel, F. B. (2015). Concepts of region and regionalization: Aspects of its evolution and possible uses to health regionalization. Sauce Soc.

Course Name: Climate Change Studies	**Course Code:** GEOG-622
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives: The objective of this course is to provide a wide-ranging understanding on climate change, understanding climate system, being aware of the impacts of climate change on society, understanding of adaptation and mitigation options in relation to climate change.

Course Outline: This course introduces the Climate, Climate system: Components; controls on climate; Latitude, Earth-sun relationships, Revolution, Rotation, Axial tilt and their combined effect, Distance to large bodies of water, Defining Climate Change, Climate, change processes, Green House Gases' emission, Drivers and Indicators of Climate Change, Cause & Effect of Climate Change. Impacts of Global Warming on a) ice sheets and glaciers, water resources and sea level rise. b) Sustainable Development, Forest, Agriculture, Land Use, Desertification, Human Health, Tourism and Natural Hazards .Global Response to Climate Change Mitigation and Adaptation, Inter Governmental Panel on Climate Change (IPPC),Climate Change , sustainable development and Milenium Development Goals, Climate Change Negotiations: Main elements of United Nations Framework Convention on Climate Change, Kyoto Protocol .Climate Change and Pakistan: Possible impacts on ecology and economics particularly water resources security, food security, energy security, human health and natural Hazards. Adaptation Strategies and their importance for Pakistan.

Course Outcome: : At the end of the course, students will be able to:

1. Understand about Climate, Climate system: Components; controls on climate; Latitude, Earth-sun relationships, Revolution.

Recommended Books:

1. Matthes, K., Dudok de Wit, T., Lilensten, J. (2021). Earth's Climate Response to a Changing Sun. France: EDP Sciences.
2. Cracknell, A. P., Varotsos, C. A. (2021). Understanding Global Climate Change: Modelling the Climatic System and Human Impacts. United States: CRC Press.
3. Trenberth, K. E. (2022). The Changing Flow of Energy Through the Climate System. United Kingdom: Cambridge University Press.
4. Almlund, P. (2016). Rethinking Climate Change Research: Clean Technology, Culture and Communication. United Kingdom: Taylor & Francis.
5. Environmental Studies and Climate Change. (2023). United Kingdom: CRC Press.
6. Climate Systems: Global Warming Series. (2017). (n.p.): Scitus Academics LLC.
7. Climate Change Handbook. (2020). United States: Syrawood Publishing House.
8. Radok, U. (2020). Toward Understanding Climate Change: The J. O. Fletcher Lectures on Problems and Prospects of Climate Analysis and Forecasting. United Kingdom: Taylor & Francis Group.
9. Felix R. FitzRoy and Elissaios Papyrakis (2016) "An Introduction to Climate Change" Economics and Policy Routledge Textbooks in Environmental and Agricultural Economics),
10. Hilary Mantel, (2016) "A Change of Climate" Methnen, UK.
11. Robert V. Rohli et.al. (2011) "Climatology".
12. Roger G. Barry (2013) "Essentials of the Earth's Climate System", Longman
13. Haydn Washington and John Cook; foreword by Naomi Oreskes (2011) "Climate Change Denial: Heads in the Sand Climate change: dangers from Greenhouse Gases from Fossil Fuels", Rutledge
14. Heidi Cullen (2010) "The Weather of the Future: Heat Waves, Extreme Storms, and Other Scenes From a Climate-Changed Planet", Routledge.

Course Name: Major XXVII (elective)	**Course Code:**
Course Structure: Lectures:3	**Credit Hours: 3**(2+1)
➢ Major Elective can be selected from elective subjects list subject to the availability of the teacher	

Course Name: Major XXVIII(elective)	**Course Code:**
Course Structure: Lectures:3	**Credit Hours: 3**(2+1)
➢ Major Elective can be selected from elective subjects list subject to the availability of the teacher	

Course Name: Capstone Research Project	**Course Code:** GEOG-699
Course Structure: Lectures: 3	**Credit Hours:** 3
Course Objectives: 1. To expose students to do practical work in a real world situation to bridge the gap between theory and practice by writing a report independently.	

2. Learn communication skills by presenting it in a seminar.

Course Outline:

Internship project outline

Internship with any public, private sector, district governments, national /international organization, inter university linkages, academic and research institutions, NGO, CBO, CCBs or Group Survey with report and its presentation in a seminar.

Thesis Format: 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

Course Outcomes:

At the end of the course, students will be able to have:

1. Experience in developing an academic research project, including conceptualising the problem with reference to geographic theory.
2. Practical experience undertaking geographic research.

Recommended Books

COURSE CONTENTS OF ELECTIVE COURSES

Course Name: Regional Planning	**Course Code:** GEOG-625
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course objective:

The objectives of the course are:

To impart spatial planning related knowledge to the students with examples both from Pakistan and other North/South countries of the world

Course outline: This course introduces the **s**cope and status, importance of Spatial/Regional Planning: Development of Theory of Planning and theories in Planning. Regional Concept: Region and its types. Identification and differentiation of Geographical, Administrative, Planning and Special Purpose regions. Regional Systems and hierarchy: Delimitation techniques, relationship between National Planning, Regional/Spatial/district and local level with special reference to Pakistan. Planning information cycle: Basic Surveys for regional planning: such as Physical, Land use, Demographic, Socio-Economic and other Surveys. The Planning process: Planning organizations, Institution and Preparation of Spatial Regional/district plans, their contents, presentation and programming. Elements and factors in Regional Planning: Peoples' and other stakeholders participation with special reference to community level planning. Spatial imbalances of Economic health: Rich and Poor area, recognition and mapping of regional inequalities with the help of data. A comparative study of area development policies/regional or Spatial planning in Pakistan and other countries of the world specially France. A critical appraisal of Regional and local level Planning in Pakistan: Major challenges, information gap, technology to suit local needs, social welfare and mobilization of masses with special reference to decentralization/devolution of power, future problems and prospects.

Course outcome:

At the end of the course, students will be able to impart spatial planning related knowledge to the students.

Recommended Books

1. Levin-Keitel, M., Behrend, L. (2023). The Topology of Planning Theories: A Systematization of Planning Knowledge. Germany: Springer Nature Switzerland.
2. Rydin, Y. (2021). Theory in Planning Research. Germany: Springer Nature Singapore.
3. Wassenhoven, L. C. (2022). Compromise Planning : A Theoretical Approach from a Distant Corner of Europe. Switzerland: Springer International Publishing.
4. LeGates, R. (n.d.). City and Regional Planning. United Kingdom: Taylor & Francis.
5. Glasson, J. (2019). Contemporary Issues in Regional Planning. United Kingdom: Taylor & Francis Group.
6. Rahmaan, A. U. (2017). Evolution of Town Planning in Pakistan: With a Specific Reference to Punjab Province. United Kingdom: Xlibris US.
7. Ashford, D. E. (2015). National Development and Local Reform: Political Participation in Morocco, Tunisia, and Pakistan. United States: Princeton University Press.
8. Glasson, J., Marshall, T. (2007). Regional Planning. United Kingdom: Routledge.

Course Name: Urban Planning	**Course Code:** GEOG-626
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course objective: The objectives of the course are:

This course is framed to train the students in Urban planning and other related issues of urban sprawl and urbanization. Examples are gives from Pakistan and elsewhere.

Course outline: This course introduces the scope of urban planning, the development of Town Planning theory with particular reference to classic example of planned area and garden city movement of Ebenzer Howard, new town movement and policy of decentralization, The role of cities in the economic growth of non-western countries.,Planning Information cycle: Basic surveys for Urban Planning, Land use, Traffic and Parking, Population and other surveys.,The Planning Process: Institutions, Preparation of the town and a neighborhood plan. Programming stages of preparation, Development controls and implementation plans. Planning Techniques: Distribution and allocation of land for residential, industrial, recreation, open spaces and other facilities. Urban environment in Pakistan: Growth of Urbanization, Internal structure of Pakistani Cities. Study of urban residential patterns, slums and squatter formation, their causes and effects, Urban renewal process and policies. Planned cities of Pakistan, with brief reference to prehistoric, Gandhara, Mughals, and British Period, Post Partition Planning, New Towns and Satellite towns. . Site and service Schemes including town built for displaced people affected from the mega-projects. Management of Urban affairs in Pakistan, current institutional set up with special reference to the local and district level institution, people participation problems and prospects Future of Pakistani cities, major challenges to urban planners and search for the ways to cope with them.

Course outcomes:

At the end of the course, students will be able to understand Urban planning and other related issues of urban sprawl and urbanization.

Recommended Books

1. Dixon, T. J., Tewdwr-Jones, M. (2021). Urban Futures: Planning for City Foresight and City Visions. United Kingdom: Policy Press.
2. Bertaud, A. (2018). Order Without Design: How Markets Shape Cities. United Kingdom: MIT Press.
3. Chiarella, D. (2005). The History of Urban Planning and Cities. (n.p.): Lulu.com.
4. Bayer, M., Frank, N., Valerius, J. (2011). Becoming an Urban Planner: A Guide to Careers in Planning and Urban Design. Germany: Wiley.
5. Crisis Resilient Urban Futures: The Future of Asian and Pacific Cities 2023. (2023). United States: UNITED NATIONS PUBN.
6. Trends in Urban Design: Insights for the Future Urban Professional. (2023). Germany: Springer International Publishing.
7. SPERLING, B. & P. SANDER (2004): Cities Ranked and Rated: More than 400 Metropolitan Areas Evaluated in the U.S. and Canada. John Wiley & Sons.
8. WASTON, D. (2003): Time-Saver Standards for Urban Design. McGraw-Hill Professional.
9. DUANY, A., E. PLATER-ZYBERK & R. ALMINANA (2003): New Civic Art: Elements of Town Planning. Rizzoli
10. HALL, P.G. & P. HALL (2002): Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century Blackwell Publishers, (3rd Revised Edition)
11. LEVY, J.M. (2002): Contemporary Urban Planning. Prentice Hall, (6th Edition).

Course Name: Geography of the Muslim World	**Course Code:** GEOG-627
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives

The objectives of the course are:

To train the student in the geography of the Muslim world

Course Contents; Origin and Dispersal of Islam, identification of Muslim majority and minority area. Muslim World as a cultural region.Relief and landform, major Physical divisions.Major Climatic Types and their role on the human and cultural activities.Spatial distribution of Resources and Economic Growth in the Muslim World. Principal Crops, Minerals and Industries.Communication and Trade.Human Resources of the Muslim World. Spatial relationship of population and Resources.Urbanization and important cities.Future of the Muslim World.Regional. Afghanistan .Saudi Arabia.Indonesia.Turkey, Bangladesh .Egypt. Iran ,Nigeria, Central Asian OIC States.

Course Outcome:

At the end of course students will be able to

1. To understand basic concept of Muslim world
2. To understand Muslim World as a cultural region.

Recommended Books

1. Hammond, T. W. (2023). Placing Islam: Geographies of Connection in Twentieth-Century Istanbul. United States: University of California Press.

2. Zwemer, S. M. (2021). Arabia: The Cradle of Islam: Studies in the Geography, People and Politics of the Peninsula, with an Account of Islam and Mission-Work. Czechia: Good Press.
3. Claiming and Making Muslim Worlds: Religion and Society in the Context of the Global. (2021). Germany: De Gruyter.
4. Zadeh, T. (2017). Mapping Frontiers Across Medieval Islam: Geography, Translation and the 'Abbasid Empire. United Kingdom: Bloomsbury Publishing.
5. Afsaruddin, Asma (2016). "Islamic World". In McNeill, William H. (ed.). Berkshire Encyclopedia of World History. Vol. 1 (2nd ed.). Berkshire Publishing Group.
6. Pinto, K. C. (2016). Medieval Islamic Maps: An Exploration. United Kingdom: University of Chicago Press.
7. İhsanoğlu, E. (2010). The Islamic World in the New Century: The Organisation of the Islamic Conference. United Kingdom: C. Hurst.
8. West Asia in Transition. (2018). India: Pentagon Press.
9. Husain, M. Z. (2006). Global Studies: Islam and the Muslim World. United Kingdom: McGraw-Hill Companies,Incorporated.
10. The Muslim World in the 21st Century: Space, Power, and Human Development. (2012). Netherlands: Springer Netherlands.
11. Muslim World. (2011). United States: Cavendish Square Publishing, LLC.
12. Stokes, J. (2011). The Muslim World. United States: Facts On File.

Course Name: Environmental Geography	**Course Code:** GEOG-628
Course Structure: Lectures: 3	**Credit Hours: 3(2+1)**

Objectives

The objectives of the course are:

To train the students in the field of environment and its relationship with factors which are apparently changing the present environment.

Course Contents: This course introduces the Introduction to Environmental Geography, Definition, Scope and Fundamental concepts of Environmental Geography. Physical and Human Environment, Components of Physical Environment and their interrelationship.Man Environment Relationships.Environmental Impacts of Economic Activities.Biosphere, Biomes and ecosystems. Terrestrial, aquatic and atmospheric biomes. Food web and food chains: Major Biogeochemical cycles (Carbon, Nitrogen and Hydrogen).Natural resources: Utilization and Management Environmental Degradation: Causes, Impacts and control mechanisms.Natural Hazards and disasters: Meaning and concepts, types, response and management of Environmental hazards and disasters. Environmental Planning and Management: National and international Co-Operation and Policy response. Environmental Issues and Problems: Global, Regional and Local Level.
Assignments: Mapping of different hazards, resources and problems at Global Regional and Local levels.

Course Outcome: At the end the students will be able to understand the basic concept of Environmental Geography, Man Environment Relationships, Biosphere, Biomes.

Recommended Books

1. Duram, L. A. (2021). Environmental Geography: People and the Environment. United States: University of Nebraska Press.
2. Plumlee, G.S. (22 April 2021). "The environmental geochemistry of mineral deposits". Journal of Geochemical Exploration.

3. Hussain, J. (2020). Environmental Geography. India: Notion Press.
4. Coith, D. (2019). Environmental Geography, Ecology, Biodiversity and Climate Change. India: Amiga Press. Incorporated.
5. Gregory, K. J. (2019). Man And Environmental Processes: A Physical Geography Perspective. United Kingdom: Taylor & Francis.
6. Awate, S. J. (2017). Environmental Geography. (n.p.): Lulu Press, Incorporated.
7. Moseley, W. G., Perramond, E., Hapke, H. M., Laris, P. (2014). An Introduction to Human-Environment Geography: Local Dynamics and Global Processes. United Kingdom: Wiley.
8. Duram, L. A. (2018). Environmental Geography: People and the Environment. United States: Bloomsbury Academic.
9. Purvis, M., Grainger, A. (2013). Exploring Sustainable Development: Geographical Perspectives. Iran: Taylor & Francis.
10. McConnell, Robert; Abel, Daniel (2014). Environmental geology today. Jones & Bartlett Learning. ISBN 978-1449684877.
11. Harada, T (22 April 2021). "The Role of Resource Recycling". Nonrenewable Resources. 2 (3): 247–255. doi:10.1007/BF02257918. S2CID 129436641

Course Name: Applied Geomorphology	**Course Code:** GEOG-629
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Objectives

The objectives of the course are:

This course is based on the application of geomorphological concepts. The main emphasis is to train the students in identification and recognition of geomorphic processes, their causes and impacts on human being**.**

Course Contents: This course introduces the Applied Geomorphology, Scope and Importance. Geomorphology and Environment**.** Geomorphic Change and Man**.**Monitoring Geomorphological Changes in the Environment Endogentetic Hazards**.** Earthquakes & Volcanicity: Cause, Morphotectonics and Earthquake, Prediction, Damages, Earthquake Hazards Zoning, Environmental Management and Earthquakes, Volcanoes**.**Hydrological Hazards**.**Rivers and Flood Plains, Flooding, Drainage Basin System, Sediment Load and Budgets, Drainage Basin/Watershed Management**.**Drought, Types and Resources, Hydrological Drought**.** Glacial and Pariglacial Environment, High-latitude and High altitude Problems. Glacial Hazards, Pariglacial Hacads, Aggradation and Degradation, Forest Hazards, Snow as a Hazard to the Urban System. Environmental Hazards in the Land Surface**.**Soil Erosion by Water and Wind, Nature and Types of Soil Erosion, Raindrop Erosion, Run-off Erosion, Aeolean Erosion, Economic and Productivity Implication**.**Weathering of Rocks and Stones, Causes, Implication**.**Desertification, Causes and Implication, Mass Movement Hazards, Concept, Classification, Causes, Snow Avalanches and Associated Problems.Mapping Geomorphology,Techniques of Geomorphological Mapping.Data Sources for Mapping.Geomorphology and Environmental Management.Geomorphology in Planning and Decision Making.National Conservation Strategy in the context of Geomorphology.

Course Outcomes

The students will be able to identify and effectively evaluate the existing conditions and propose suitable measures for reducing risks in decision making process for development.

Recommended Books

1. Huggett, R., Shuttleworth, E. (2022). Fundamentals of Geomorphology. United Kingdom: Taylor & Francis.
2. Hagg, W. (2022). Glaciology and Glacial Geomorphology. Germany: Springer Berlin Heidelberg.

3. Hart, M. (2020). Geomorphology: Pure and Applied. United Kingdom: Taylor & Francis.
4. Applied Geomorphology and Contemporary Issues. (2022). Switzerland: Springer International Publishing.
5. Current Perspectives on Applied Geomorphology. (2024). United Kingdom: IntechOpen.
6. New Advancements in Geomorphological Research: Issues and Challenges in Quantitative Spatial Science. (2024). United States: Springer Nature Switzerland.
7. Chorley, R. J., Burt, T. P., Dunn, A. J., Beckinsale, R. P., Goudie, A., Brunsden, D., Cox, N. J. (2022). T he History of the Study of Landforms: Or, The Development of Geomorphology. United Kingdom: Methuen.
8. Davies, T. R., Korup, O., Clague, J. J. (2021). Geomorphology and Natural Hazards: Understanding Landscape Change for Disaster Mitigation. United Kingdom: Wiley.
9. DiPietro, J. A. (2024). Geology and Landscape Evolution: General Principles Applied to the United States. United States: Elsevier Science.

Course Name: Rural Geography	**Course Code:** GEOG-630
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course objectives:

The objectives of the course are:

To train the student in different aspects of rural life, its problems and rural development strategies. This course will be studied with special reference to Pakistan and with general reference to other parts of the world.

Course outlines: This course introduces the definition, Nature and Scope of Rural Communities: The Concept of Community and Social Capital. Social Change and the rural community. Rural Depopulation: Types of Depopulation. Reasons of Depopulation Size and direction. The Selection and Migrants. The Decision to migrate. The changing economic structure of rural settlements. Structural Changes in Agriculture: Plot consolidation. Farm Enlargement. Settlement Re-modeling. Land Reforms. Land use changes. Patterns and Processes of Settlements: Form and Patterns. Settlement Rationalization in Rural Areas. Urbanization of the Rural Areas: Passenger Transportation in Rural Areas. Rural Development Program, and Strategies with special reference to Pakistan since 1947 up to date.

Course Outcomes:

At the end of the course, students will be able to

1.Analyze the changing economic structure of rural settlements.

2.Understand Settlement Re-modeling and Land Reforms.

Recommended Books

1. Yarwood, R. (2023). Rural Geographies: People, Place and the Countryside. United Kingdom: Taylor & Francis.
2. Kneafsey, M. (2017). Geographies of Rural Cultures and Societies. United Kingdom: Taylor & Francis.

3. Steinführer, A., Grabski-Kieron, U. (2020). NEW RURAL GEOGRAPHIES IN EUROPE: Actors, Processes, Policies. Switzerland: Lit Verlag.
4. Vaz, T. d. N., Leeuwen, E. v. (2016). Towns in a Rural World. United Kingdom: Taylor & Francis.
5. Fournier, M. (2021). Rural Writing: Geographical Imaginary and Expression of a New Regionality. United Kingdom: Cambridge Scholars Publisher.
6. Rural-Urban Linkages for Sustainable Development. (2022). United Kingdom: Routledge.
7. Bunce, M. (2017). Rural Settlement in an Urban World. United Kingdom: Taylor & Francis.
8. Ilbery, B. W. (2014). The Geography of Rural Change. United Kingdom: Taylor & Francis.
9. Cloke, P. (2014). An Introduction to Rural Settlement Planning (Routledge Revivals). United Kingdom: Routledge.
10. Hoggart, K., Buller, H. (2015). Rural Development: A Geographical Perspective. United Kingdom: Taylor & Francis.
11. Kneafsey, M. (2017). Geographies of Rural Cultures and Societies. United Kingdom: Taylor & Francis.

Course Name: Transportation Geography	**Course Code:** GEOG-631
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives. To train student in different aspects of transportation, its importance and relevance to development**.** To highlight the role of Geography in the development of transport.

Course Contents: This course introduces the definition, Types, scope and status and importance for development. Historical overview of Transportation and Communication System Types of Transportation Transport Networks. Network efficiency The Development of Networks: Models of Networks Development. Distortion and Deviation. Networks at Climax The use of graph theory to study transport Networks The Motion of Accessibility Spatial Interaction and Transport Flows: Ways of studying spatial interaction. Study of volume of Interaction between areas. The Gravity Model of spatial interaction.Ullman Model. A mere General Statement of Curve filtration for spatial interactionTransportation Competition and Model choice.Economic Distance. Transport Cost. Non-Cost Factors. Ports and Sea Transportation:. New Trends in Container Traffic. Air Transportation Transportation and Communication Systems in Pakistan and related problems.

Course outcome: At the end of the course, students will be able to:
1. Understand the fundamental aspects of Transport and communication
2. Comprehend the key concepts of Ullman Model

Recommended Books

1. Cidell, J. (2021). An Introduction to Transportation Geography: Transport, Mobility, and Place. United States: Rowman & Littlefield Publishers.
2. Barr, S., Prillwitz, J., Ryley, T., Shaw, G. (2020). Geographies of Transport and Mobility: Prospects and Challenges in an Age of Climate Change. United Kingdom: Taylor & Francis Limited (Sales).
3. Lee, E. (2023). Geographic Information Systems for Intermodal Transportation: Methods, Models, and Applications. Netherlands: Elsevier Science.
4. Adams, J. (2021). Transport Planning: Vision and Practice. United Kingdom: Taylor & Francis.

5. HARVEY J. M & S. LUNG SHAW (2001): Geographic Information Systems for Transportation: Principles and Applications (Spatial Information Systems. Oxford University Press.
6. Sánchez-Triana, E., Biller, D., Nabi, I. (2014). Revitalizing Industrial Growth in Pakistan: Trade, Infrastructure, and Environmental Performance. United States: World Bank Publications.
7. Rodrigue, J., Comtois, C., Slack, B. (2013). The Geography of Transport Systems. United Kingdom: Taylor & Francis.

Course Name: Geography of South and South East Asia	**Course Code**: GEOG-632
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives:

1. Explore the diverse landscapes, cultures and environmental challenges of south and south east asia in this comprehensive geography course.
2. This course will provide students with deep understanding of physical and human geography of the region, as well as the socio economic and environmental issues at its faces

Course Contents: This course introduces South and Southeast Asia regions. Overview of the region Geographical Boundaries. Cultural and linguistic Diversity,Physical Geography.Major landforms and rivers,Climatic Zones,Biodiversity and Ecosystems.Historical Overview.Ancient civilization. Colonialism and Independence, Post-Independence developments. Population and Demographics, Population distribution ,Ethnic groups and languages,Urbanization and migration,Political Geography,Countries and capitals,Border disputes and conflicts,Regional organizations,Cultural Diversity,Religions and belief systems,Traditional arts and architecture,Cuisine and festivalsEconomic GeographyAgriculture and rural development.Industrialization and trade.Economic disparities.Environmental Challenges,Deforestation and habitat loss.Pollution and water resources.Climate changes impacts,Urbanization and urban issues,Mega cities and urban growth,Slums and informal settlements.Tourism and heritage,Cultural and natural heritage sites,Tourism development and impacts ,Sustainable tourism practices,Geopolitics and Regional Relations ,Major Regional Powers,Conflicts and Alliances.Regional Cooperation,Future Prospects and Challenges ,Emerging Trends in the region.Geopolitical Shifts,Sustainability and development goals.

Course Outcomes: At the end of the course, students will be able to:

1. Understand the fundamental aspects of Geographical boundaries.

2. Comprehend the key concepts of cultural diversity, geopolitics and regional relations.

Recommended Books:

1. Phillips, D. (2021). Southeast Asia, Second Edition. United Kingdom: Infobase Publishing.
2. Machajewski, S. (2020). The Geography of East and Southeast Asia. United States: Rosen Publishing Group.
3. Finlayson, C. (2019). World Regional Geography. (n.p.): Independently Published.
4. Locating Southeast Asia: Geographies of Knowledge and Politics of Space. (2020). Netherlands: Brill.
5. Yusuf, S., Nabeshima, K. (2010). Changing the Industrial Geography in Asia: The Impact of China and India. Ukraine: World Bank.

6. Phillips, D. (2021). East Asia, Second Edition. Spain: Infobase Publishing.
7. Rush, J. R. (2018). Southeast Asia: A Very Short Introduction. United Kingdom: Oxford University Press.
8. Rigg, J. (2003). Southeast Asia: The Human Landscape of Modernization and Development. United Kingdom: Routledge.Books, M. (2020). World Regional Geography: World Maps & Geographic Standings Atlas. United States: Independently Published.

Course Name: Cultural Geography	**Course Code:** GEOG-633
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives.

1. To study the way culture works as a tool in man-environment interaction as it varies from area to area.

Course Contents: This course introduces the Culture: Elements of culture, objectives, scope and status of cultural Geography.Main themes of Cultural Geography: Culture and cultural areas, Cultural Landscape, Cultural History and Cultural Ecology, Cultural hearth.Cultural Process: Origin and diffusion of Culture, cultural change.Man, Nature and Culture Culture through ages: Paleolithic, Neolithic, Bronze and Iron age. Stages of Socio-economic Development.The study of the following as cultural phenomena: Religions, Settlements and House types.Cultural Regions.

Course outcome: At the end of the course, students will be able to:

1. Understand the fundamental aspects of culture and its diversity

2. Comprehend the key concepts of cultural regions

Recommended Books:

1. Crang, M. (2013). Cultural Geography. United Kingdom: Taylor & Francis.
2. Ogborn, M., Blunt, A., Gruffudd, P., Pinder, D. (2014). CULTURAL GEOGRAPHY IN PRACTICE. United Kingdom: Taylor & Francis.
3. Horton, J., Kraftl, P. (2013). Cultural Geographies: An Introduction. United Kingdom: Taylor & Francis.
4. Murphey, R. (2014). The Scope of Geography (RLE Social & Cultural Geography). United Kingdom: Taylor & Francis.
5. Spencer, J. E. (2003). Asia, East by South: A Cultural Geography. (n.p.): Textbook Publishers.
6. Matthews, M. D., 231514. (2008). Cultural Geography Student Text 3rd Edition. United States: BJU Press.
7. Cultural Histories, Memories and Extreme Weather: A Historical Geography Perspective. (2020). United Kingdom: Taylor & Francis Group.

Course Name: Population Geography	**Course Code:** GEOG-634
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

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: This course introduces Population theories**,** Sources and methods of population data collection and associated Problems**,** Population distribution and density**,** Urban and rural population**,** Population composition: gender composition, age structure, marital status, families and households, languages, religions, ethnic groups etc. Population dynamics: Migration and its types**,** Demographic transition**,** Population growth and change**,** Population Projections

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

Course Outcomes: : At the end of the course, students will be able to:

1. Understand about population ,methods of population data collection.

Recommended Books

1. Hassan, M. I. (2020). Population Geography: A Systematic Exposition. India: Taylor & Francis.
2. Ardagh, M. (2013) Textbook of Population Geography, Random Exports,New Delhi
3. Sharma, R. K. (2007) Demography and Population problems, Atlantic Publishers, New Delhi.
4. Clarke, J. I. (2013). Population Geography: Pergamon Oxford Geographies. United Kingdom: Elsevier Science.
5. Qazi, S. A. (2010). Population Geography. India: APH Publishing Corporation.
6. Bailey, A. (2014). Making Population Geography. United Kingdom: Taylor & Francis.
7. Larkin, R. P., Johnson-Webb, K., Otiso, K. M. (2013). Population Geography: Problems Concepts and Prospects. United States: Kendall Hunt Publishing Company.
8. Hornby, W. F., Jones, M. (2002). An"introduction to Population Geography. United Kingdom: Cambridge University Press.
9. Population Geography. (2020). India: S.K. Book Agency.
10. Barcus, H. R., Halfacree, K. (2017). An Introduction to Population Geographies: Lives Across Space. United Kingdom: Routledge.
11. Newbold, K. B. (2017). Population Geography: Tools and Issues. United States: Rowman & Littlefield Publishers.

Course Name: Geography of Resource Conservation	**Course Code:** GEOG-635
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course Objectives. To train the student in resource studies and resource management systems

Course Contents: This course introduces the study of Resources, Concept and Approaches to Natural Resource Management,Resources and their appraisal.Meaning and Nature of Resources, Energy and Resources, Resource, Aspects: Natural, Human and Cultural, Nature and resource, Man and resources, Culture and Resource. Resources, space and People, Flora and Fauna, Renewable and non-renewable resources.Agricultural, Industrial, Mineral, Land, Water, Forest, Wildlife,

Course outcome: At the end of the course, students will be able to:

1. Understand the study of resources

2. Comprehend the key concepts of Natural resource management

Recommended Books

1. Mohammad, N., Datta, A. (2007). Spatial Information Technology for Natural Resource Management. India: Department of Geography, Delhi University.
2. Hussain, J. (2020). Environmental Geography. India: Notion Press.
3. Young, A. (2000). Land Resources: Now and for the Future. United Kingdom: Cambridge University Press.
4. Management of Water Resources in Protected Areas. (2013). Germany: Springer Berlin Heidelberg.
5. Chiras, D. D., Reganold, J. P., Owen, O. S. (2002). Natural resource conservation : management for a sustainable future. United Kingdom: Prentice Hall.
6. Land Cover and Land Use Change on Islands: Social & Ecological Threats to Sustainability. (2020). Germany: Springer International Publishing.
7. Maillet, S. A. (2013). Natural Resources: Conservation Strategies, Globalization & Politics and Sustainable Uses. United States: Nova Science Publisher's, Incorporated.
8. Green, J. (2012). Sustaining Our Natural Resources. United Kingdom: Raintree.
9. Ball, J. A. (2004). Conservation and Natural Resources. United States: Gareth Stevens Pub..

List of courses to be offered to other departments under the category of natural sciences

S.No	Courses to be offered to other departments under the category of Natural Sciences.		
	Subject	Credit Hours	Course Codes
1.	Fundamentals of Geography	3(2+1)	GEOG-311
2.	Geography of Pakistan	3(2+1)	GEOG-411

COURSE CONTENTS

Course Name: Fundamentals of Geography	**Course Code:**GEOG-311
Course Structure: Lecture 3	**Credit hours:** 3(2+1)

Course Objective:

1) To expose students to the founding principles of Geography and geographical knowledge.
2) To abreast students with various terms employed in the understanding of different geographical processes and functions**.**

Course Outline: This course introduces students to the basic principles of Geography and Geographical Knowledge; Introduction, Definitions, scope and branches of Geography, Roots of the discipline and basic geographic concepts, Themes and traditions of Geography, Tools of Geography, the Universe Galaxies and

solar system, Earth as a planet, Celestial positions, its shape and size, Rotation, revolution and related phenomena, Spheres of the earth, Lithosphere, Atmosphere, Hydrosphere, Biosphere, Man-environment interaction, Population, Major Economic activities Settlements etc.

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

Course Outcomes:

At the end of the course, students will be able to:

1. Understand the fundamentals of Geography

2. Comprehend the key concepts of earth's evolution as a part of the universe, and its major

spheres.

Recommended Books:

1. Dada, Anup (December 2022). "The Process of Geomorphology Related to Sub Branches of Physical Geography". Black Sea Journal of Scientific Research.
2. Eratosthenes (2010). Eratosthenes' "Geography". Fragments collected and translated, with commentary and additional material by Duane W. Roller. Princeton University Press.
3. Adam Dastrup (2021)"Physical Geography and Natural Disasters" . California Open Online Library.
4. Ritter (2021)"The Physical Environment: an Introduction to Physical Geography" California Open Education Resource Council CA OER.
5. Patrich and Radtke (2020)"Physical Geography – Version 1" Publisher: College of the Canyons.
6. Arbogast, A. F. (2017). Discovering Physical Geography, Fourth Edition: John Wiley & Sons, lncorporated.
7. Dahlman, C. H., Renwick, W. H., & Bergman, E. (2015). lntroduction to Geography: People, Places & Environment, Global Edition: Pearson Education Limited'
8. Dunbar, G. S. (2016). Modern Geography: An Encylopaedic Survey: Taylor & Francis.
9. Knox, P. 1., & Marston, S. A. (2015). Human Geography: Places and Regions in Global Context: Pearson.
10. Mayhew, S. (2015). A Dictionary of Geography: Oxford University Press.
11. Nagle, G., & Cooke, B. (2017). lb Geography Course Book2nd Edition: Oxford lb Diploma Programme: Oxford University Press,
12. Francis. 9. Rubenstein, J. M. (2015). Contemporary Human Geography: Pearson Education.

Course Name: Geography of Pakistan	**Course Code:** GEO-411
Course Structure: Lectures: 3	**Credit Hours:** 3(2+1)

Course 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: This course introduces the students to Geo-strategic position of Pakistan**,** Location and Geographical significance**,** Geo-political Importance**,** Administrative setup**,** Land and Physical Environment:**,** Physiography**,** Climate and climatic regions**,** Hydrology**,** Soils and vegetation**,** The People**,** Population characteristics: structure, composition and Distribution, Population Change, Urbanization, Economy, Agriculture (crops and livestock), Irrigation, Power and mineral resources, Industries, Trade, Tourism, Transport and Communication, Major challenges of Pakistan, 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, mining area, national parks, industrial areas and various rural and urban settlements and other natural resources.

Course outcome: At the end of the course, students will be able to:

1. Understand Major challenges of Pakistan, Water, power, security and environmental issues.

Recommended Books

1. Devasher, T. (2024). Pakistan Insights 2023. India: Pentagon Press Llp.
2. Fitzpatrick, H. (2024). Mapping Partition: Politics, Territory and the End of Empire in India and Pakistan. United States: John Wiley & Sons.
3. Mustafa, D. (2021). Contested Waters: Sub-national Scale Water and Conflict in Pakistan. United Kingdom: Bloomsbury Academic.
4. Small, A. (2020). The China-Pakistan Axis: Asia's New Geopolitics. United States: Oxford University Press.
5. Rehman, A. (2013). Mapping Lahore: Tracing Historical Geography of a City Through Maps. Pakistan: Al-Mezaan Publishers and Book Sellers.
6. QURESHI, A., QURESHI, I., QURESHI, S. (2018). Geography of Pakistan. (n.p.): Independently Published.
7. Graham, I. (2009). Pakistan. United States: Sea-to-Sea Publications.
8. Blashfield, J. F. (2011). Pakistan. United Kingdom: Raintree.
9. Khan, F. K. (2011). Oxford Atlas for Pakistan, New Edition. Pakistan: Oxford University Press.
10. Marsh, W. M., Kaufman, M. M. (2013). Physical Geography: Great Systems and Global Environments. United Kingdom: Cambridge University Press.
11. Abbasi, B. A. (2008). Geography of South Asia : as a whole region. Pakistan: Sang-e-Meel Publications.
12. Fazle Karim Khan ,(2008)A Geography of Pakistan: Environment, People and Economy, Oxford University Press
13. Pakistan Minerals Development Corporation: www.pmdc.gov.pk