

ZOOL-4104**Zoogeography and Palaeontology**

Course & Course Code	Zoogeography and Palaeontology / ZOOL-4104
Credit Hours	2
Department	Basic Sciences and Humanities
Course Type:	Major
Theory/Lab	Theory
Program/semester/section	BS Program/1A
Semester	Ist
Course Instructor name/Designation	Ms. Ammara Atta
Office	BSH building, Ist floor.
Office Hours / Counseling hours for students	8:00 a.m – 4:00 p.m/ 9:00 a.m – 4:00 p.m
Email ID:	

Note: For practical/lab work, a separate teaching plan can be prepared.

Week 1	
Objectives / Learning Outcome	A comprehensive understanding of paleogeography, including the theories of continental drift and plate tectonics. Understanding Paleogeography • Explain the Continental Drift Theory and its supporting evidence. • Describe the concept of Plate Tectonics and its role in shaping Earth's surface. • Understand Pangea and how it influenced species distribution and evolution.
Contents / Sub Contents	Introduction to Paleogeography • Theories of Continental Drift • Plate Tectonics

	• Pangea
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 2	
Objectives / Learning Outcome	Knowledge of animal distribution patterns, barriers to dispersal, and the factors influencing biogeographical distributions. Analyzing Animal Distribution • Differentiate between cosmopolitan, discontinuous, isolation, bipolar, and endemic distributions. • Assess the role of barriers and dispersal in shaping global biodiversity.
Contents / Sub Contents	Animal Distribution Patterns • Cosmopolitan, Discontinuous, Isolation, Bipolar, and Endemic Distribution • Barriers and Dispersal
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.

Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 3	
Objectives / Learning Outcome	An in-depth study of zoogeographical regions, including their physical features, climates, and fauna. Exploring Zoogeographical Regions • Classify the world's zoogeographical regions based on physical and climatic factors. • Compare the faunas of the Palaearctic, Nearctic, Oriental, Ethiopian, Australian, and Neotropical regions. • Evaluate the significance of insular fauna in evolution.
Contents / Sub Contents	Zoogeographical Regions • Zoogeographic Division and Boundaries • Geographic Ranges and Physical Features
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	

Week 4	
Objectives / Learning Outcome	Insight into Pakistan's zoogeography, highlighting its unique biodiversity and historical influences. Studying Zoogeography of Pakistan Explain the biogeographic characteristics of Pakistan, including its species diversity and distribution.
Contents / Sub Contents	Zoogeographical Regions Climates and Faunas of the Palaearctic, Nearctic, Oriental, Ethiopian, Australian, and Neotropical Regions
Appropriate Teaching Strategies / Methods	- Slides and handouts - Written Assignments - Multimedia projectors and white board - Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	- Oral and Written questions. - Observation/ demonstration checklists. - Administration - Instructions
Assessment Schedule	Weekly
Others	
Week 5	
Objectives / Learning Outcome	- Understand zoogeography, Pakistan's faunal distribution, insular fauna, island biogeography, biogeographical barriers, and conservation strategies. - Analyze species distribution, identify endemic and insular species, apply island biogeography principles, assess biogeographical barriers, and propose conservation solutions.
Contents / Sub Contents	- Insular Fauna - Zoogeography of Pakistan
Appropriate Teaching	- Slides and handouts - Written Assignments

Strategies / Methods	• Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 6	
Objectives / Learning Outcome	• Understand Earth's history, age, structure, and its major spheres (atmosphere, hydrosphere, biosphere, lithosphere). • Explain Earth's formation, analyze its layers, and describe interactions between the atmosphere, hydrosphere, biosphere, and lithosphere.
Contents / Sub Contents	The Planet Earth • History, Age, and Shells of Earth • Atmosphere, Hydrosphere, Biosphere, Lithosphere
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 7	

Objectives / Learning Outcome	- Understand the formation, characteristics, and classification of igneous, sedimentary, and metamorphic rocks. - Identify and differentiate rock types, explain their formation processes, and analyze their significance in Earth's geology.
Contents / Sub Contents	Rocks and Their Types Igneous, Sedimentary, and Metamorphic Rocks
Appropriate Teaching Strategies / Methods	- Slides and handouts - Written Assignments - Multimedia projectors and white board - Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	- Oral and Written questions. - Observation/ demonstration checklists. - Administration - Instrutions
Assessment Schedule	Weekly
Others	
Week 8	
Objectives / Learning Outcome	- Understand fossils, fossilization processes, invertebrate and vertebrate fossils, biostratigraphy, and fossils found in Pakistan. - Identify fossil types, explain fossilization, apply biostratigraphy principles, and analyze key fossil discoveries in Pakistan.
Contents / Sub Contents	Fossils and Fossilization - Invertebrate and Vertebrate Fossils - Biostratigraphy - Fossils of Pakistan
Appropriate Teaching Strategies / Methods	- Slides and handouts - Written Assignments - Multimedia projectors and white board - Presentation, Quiz weekly

Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 9	
Objectives / Learning Outcome	• Understand the geological time scale, evolutionary history, and major life forms of the Pre-Cambrian and Post-Cambrian periods, including the Paleozoic, Mesozoic, and Cenozoic eras. • Explain Earth's evolutionary timeline, identify key life forms in each era, and analyze the significance of major geological and biological events.
Contents / Sub Contents	Geological Time Scale and Evolutionary History • Pre-Cambrian and Post-Cambrian Life • Paleozoic, Mesozoic, and Cenozoic Eras
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 10	

Objectives / Learning Outcome	• Understand paleontological excavation techniques, tools, and methods used for fossil recovery and analysis. • Apply excavation techniques, use appropriate tools, and analyze fossil findings for scientific research.
Contents / Sub Contents	Paleontological Techniques • Excavation Techniques and Tools
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 11	
Objectives / Learning Outcome	• Understand the prerequisites, techniques for excavation, transportation, processing, and presentation of fossils. • Apply proper excavation methods, handle and process fossils, and effectively present paleontological findings.
Contents / Sub Contents	Paleontological Techniques • Transportation, Processing, and Presentation of Fossils Prerequisites for Paleontological Excavation.
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists.

	• Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 12	
Objectives / Learning Outcome	• Understand paleontological techniques and geochronometry, including Uranium-Lead and Radiocarbon dating methods. • Apply dating techniques to determine fossil ages and analyze geological time accurately.
Contents / Sub Contents	Paleontological Techniques Geochronometry • Uranium/Lead Dating • Radiocarbon Dating Methods
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 13	
Objectives / Learning Outcome	Understand geochronometry, index fossils, and the evolutionary history of humans, elephants, horses, and camels. Use index fossils for dating, analyze evolutionary trends, and interpret the fossil records of key species.
Contents / Sub Contents	Geochronometry • Index Fossils

	• Evolutionary History of Man, Elephant, Horse, and Camel
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 14	
Objectives / Learning Outcome	☐ Define paleoecology and explain its significance in understanding past ecosystems. ☐ Identify methods used in paleoecological studies, such as fossil analysis, sediment studies, and isotopic techniques. ☐ Explain the concept of paleomagnetism and its role in geosciences. ☐ Describe how Earth's magnetic field has changed over time and its geological implications.
Contents / Sub Contents	• Paleoecology • Paleomagnetism
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.

Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 15	
Objectives / Learning Outcome	• Apply theoretical knowledge to real-world scenarios, and demonstrate a comprehensive understanding of the subject matter.
Contents / Sub Contents	Presentations
Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	
Week 16	
Objectives / Learning Outcome	☐ key concepts through discussions and practical applications, with learning outcomes including the ability to recall essential topics, apply theoretical knowledge to real-world scenarios, and demonstrate a comprehensive understanding of the subject matter.
Contents / Sub Contents	Review and Final Assessment • Recap of Key Topics • Discussions and Practical Applications

Appropriate Teaching Strategies / Methods	• Slides and handouts • Written Assignments • Multimedia projectors and white board • Presentation, Quiz weekly
Learning Material	Text books, Multimedia Presentations, Visual aids.
Appropriate Assessment Tools	• Oral and Written questions. • Observation/ demonstration checklists. • Administration • Instructions
Assessment Schedule	Weekly
Others	

Curriculum content:

1. Paleo geography

- a. Theories of continental drift and plate tectonics
- b. Pangea

2. Animal distribution

- a. cosmopolitan distribution
- b. discontinuous distribution
- c. isolation distribution
- d. bipolar distribution
- e. endemic distribution
- f. barriers and dispersal.

3. Zoogeographical regions:

- a. Zoogeographic Division and Boundaries
- b. Geographic Ranges, Physical Features
- c. Climates,
- d. Faunas And Affinities Of Palaearctic, Nearctic Regions, Oriental, Ethiopian, Australian, And Neotropical Regions
- e. Insular Fauna

4. Zoogeography of Pakistan:

5. Paleontology:

The Planet Earth

- a. History, age, shells of earth
- b. atmosphere, hydrosphere, biosphere and lithosphere.

6. Rocks:

- a. Types; Igneous rocks, sedimentary rocks and metamorphic rocks.

7. Fossil and Fossilization

- a. Fossil types and uses of fossils, nature of fossils.
- b. Fossilization
- c. Invertebrates and Vertebrates Fossil
- d. Biostratigraphy
- e. Fossils of Pakistan
- f. Paleontologically important areas of Pakistan.

8. Fossilization:

- a. Geological time scale.
- b. Pre-Cambrian life.
- c. Post Cambrian life,
- d. Paleozoic life
- e. Mesozoic life
- f. Cenozoic life.

9. Paleontological Techniques

- a. Excavation techniques
- b. Excavation tools and techniques
- c. Transportation and processing of fossils.
- d. Presentation of fossils
- e. Pre requisites for paleontological excavation.

10. Geochronometry:

- a. Uranium/Lead dating
- b. radiocarbon dating, methods
- c. index fossils
- d. evolutionary history of man, elephant, horse and camel,
- e. Paleoecology, Paleomagnetism.

