**** The Islamia University of Bahawalpur

**Department of Zoology**

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| **Course Instructor** | Prof. Dr. Nuzhat Sial |
| **Course Title** | Animal migration |
| **Course Code** | Zool-42103 |
| **Program** | PhD Zoology |
| **Semester** | 1st |
| **Level** | Post graduate |
| **Credit Hours** | 3 (3+0) |

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| **Aims & Objectives:**  1. Provide in-depth knowledge of migration in animal sciences  2. Develop concepts about importance of the animal migration.  3. Study the patterns of migration with basic rules.  4. Migration in different animal groups. |

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| **Contents** |
| 1. Migration in insect: migratory species, characteristics o migrator fights, number, timing, , distance, flight height, speed, direction, energy requirements. |
| 2. Navigation aids: landmarks, wind, celestial cues, earths magnetism, physical factors odor, return migration, why migration. |
| 3. Migration in fishes: lampreys, fishes, anadromou migrations, salmons, pacific salmon’s hilsa, catadromous migrations. |
| 4. Migration and environmental factors, route finding. |
| 5. Migration In amphibian and reptilian |
| 6. Bird’s migration. |

**Weekly plan**

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| 1st Week | Migratory species and their importance |
| 2nd Week | Characteristics of migratory fights, number, timing and distance |
| 3rdWeek | Migration flight, height and speed |
| 4thWeek | Direction of migration and their energy requirements |
| 5thWeek | Landmarks, wind and celestial cues for migration |
| 6thWeek | Earths magnetism and migration and physical factors odour |
| 7thWeek | Return migration and why migration is done |
| 8thWeek | **Mid Term Examination** |
| 9thWeek | Migration in fishes: lampreys and fishes |
| 10thWeek | Anadromou and catadromous migrations |
| 11th Week | Salmons and pacific salmon’s hilsa migration |
| 12thWeek | Migration and environmental factors, |
| 13th Week | Route finding |
| 14thWeek | Migration In amphibian |
| 15thWeek | Migration In reptilians |
| 16th Week | Bird’s migration |

**Suggested Readings**

1. David J. Aidley. *Animal migration*. Blackwell Science, Oxford

2. Gretel H.Schueller, Sheila K. Schueller. 2009, Animal migration

3. Ahmed, Manzoor. *Animal Migration.* NAHE. 1988

4. Schueller, Gretel H., and Sheila K. Schueller. *Animal Migration*. Infobase Publishing, 2009.

5. Milner-Gulland, E. J., John M. Fryxell, and Anthony RE Sinclair, eds. Animal migration: a synthesis. Oxford University Press, 2011.

**Student Evaluation criteria:**

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| Attendance | 5% |
| Workshop / Assignments/Case study | 5% |
| Surprise Test/Sudden Test , Quizzes | 5% |
| Class Participation | 5% |
| Mid Term Paper | 30% |
| Final Term paper | 50% |
| **Total** | **100%** |

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| **Academic and Moral Integrity for Students:**    Students must attend class on time and remain in class for the period.  Cellular Phones and Beeper must be Turned off (Proper classroom decorum [behavior] adopts, Course outlines and calendars explain requirements and assignments.  Students are also responsible for doing all assigned work on time. Excessive absences (more than 03) will result in “F Grade”. Students may prepare Sketchbook for taking notes and for references. |

**Instructor/Tutor**

**Approved by:**

**Chairperson**