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| **Semester:** | 07 | | |
| **Course Code:** | ZOOL 41823 | | |
| **Course Name:** | Ecological Interactions and Dynamics | | |
| **Credit Value:** | 03 | | |
| **Status:** | Compulsory | | |
| **Pre-requisite:** | ZOOL 22732 | | |
| **Co-requisite:** | None | | |
| **Hourly breakdown:** | Theory | Practical | Independent Learning |
| | 40 | 15 | 95 |

**Intended Learning Outcomes:**

After completion of this course unit, the student will be able to:

1. discuss the biotic and abiotic interactions in animal communities,
2. discuss the functional significance of foraging, habitat selection and species coexistence in variable environments,
3. explain the models and theories related to animal interactions and distributions,
4. discuss the significance of disturbance events on animal communities, and
5. apply computer-based simulations to assess ecological interactions.

**Course Content:**

Overview of ecological interactions. Biotic and abiotic interactions in an ecological community. Biodiversity and ecosystem functioning. Species diversity versus productivity and stability. Ecology of habitat selection and Ideal Free Distribution Theory. Ecological succession and Community Assembly Theory. Biogeographic factors affecting community diversity. Effects of pathogens and zoonotic diseases on animal communities. Species coexistence in variable environments. Foraging interactions: feeding at different trophic levels, modifying food supply, trapping and detecting food, diet selection, fitness maximization and decision making in feeding. Theories on animal foraging: Optimality Theory, Optimal Foraging Theory and Marginal Value Theory. Competition: types of competition, temporal and spatial partitioning of resources, competitive exclusion principle, species co-existence and character displacement, modeling interspecific competition, application of Game Theory to analyze competition. Predation: predator and prey strategies, cannibalism, and modeling predator-prey dynamics. Symbiotic community interactions: parasitism, mutualism and commensalism. Microbiome. Ecology of disturbance: effects of disturbances on natural communities, patchy environments, relic and fugitive species, species resilience, patch dynamics, meta-populations, Intermediate Disturbance Hypothesis. Preference Performance Hypothesis. Dominance and territorial interactions. Kin selection and altruistic interactions. The Socio-ecological System (SES) Theory. Introduction to ecological modelling.

Practical sessions on computer-based simulations on ecological interactions.

**Teaching/ Learning Methods:**

A combination of lectures and practical sessions, assignments, computer-based learning, student seminars and group discussions.

**Assessment Strategy:**

Continuous assessment and end of semester examination. Percentage given for each sub-component indicates the percent contribution to the final marks.

<table>
<tr><td colspan="2">Continuous Assessment<br>35 %</td><td colspan="3">Final Assessment<br>65 %</td></tr>
<tr><td colspan="2">Details:<br>Practical reports 15 %<br>Student seminars 10 %<br>Assignments 10 %</td><td>Theory<br>65 %</td><td>Practical<br>-</td><td>Other<br>-</td></tr>
<tr><td colspan="5">Recommended Readings:<br>1. Smith, R.L. & T.M. Smith (2015). Elements of Ecology, 9th Edition. Pearson Publications.<br>2. Mangel, M. (2006). The Theoretical Biologist’s Toolbox. Cambridge University Press.<br>3. Osborne, P. L. (2012). Tropical Ecosystems and Ecological Concepts. 2nd Edition, Cambridge University Press.<br>4. Mittelbach, G.G. (2012) Community Ecology. Sinauer Associates.<br>5. Recently published scholarly review articles on ecological interactions.</td></tr>
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