

Course in Ecology and Environmentm(ID1200)

January 2017

IIT Palakkad

2 contact hours/ week for 14 weeks (28 contact hours)

Coordinator:

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Goal

The goal of the course is to introduce and sensitize the first year IIT students to ecosystem structure and functioning, disruptions to these through historic and recent 'development' activities' and to explore solutions to these in modern technology. The latter is becoming a 'normal' career for engineers. The focus of the course is on terrestrial ecosystems.

At the end of the course the students are expected to have an understanding of:

1. How the present distribution and diversity of organisms and ecosystems have been shaped by evolution over millions of years;
2. How terrestrial ecosystems function, in terms of energy flows and mineral cycles;
3. The structure of ecosystems with reference to different life forms, food webs, and distribution;
4. Major centre of biological diversity and its values to human societies;
5. India's conservation policies and laws, and protected areas;
6. The disruption of ecosystem structure and function through various anthropogenic activities, and its consequences; and
7. The potential for technological solutions that can address the erosion of ecosystem structure and function.

The pedagogy would consist of classroom lectures, guest talks on case studies, audio-visual media and visits to forest areas

Syllabus

Tree of Life; Basic concepts in evolution: selection, inheritance, and genetic variation; Formation of new species; influence of climate on life on earth.

Energy and matter in ecosystems; interactions of organisms with their physical environment; species interactions;

Biodiversity - values; ecosystem services; direct utility value; species of importance; Biodiversity hotspots - India's wildlife and protected areas; wildlife policies and laws

Global and local threats to biodiversity; historical and current threats; assessing threats to species

Case studies on threats to biodiversity and environment:

1. Documentaries (4 classes) e.g. Mindless mining, Making room for nature, Truth about tigers
2. Guest talks - forest hydrology and hydel projects (2), Pollution, environment and animals (1), human-elephant interactions (1), linear intrusions (1),

Field trip to Valparai: use of SMS in tackling human-elephant conflict, restoration work, fragmentation impacts etc.

Major references

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1. Evolution: http://evolution.berkeley.edu/evolibrary/article/evo_01
2. Species interactions: <http://www.nature.com/scitable/knowledge/library/species-interactions-and-competition-102131429>
3. Bawa, K.S, and Oommen, M.A. (2010). Conservation Biology, University Press.
4. Sekercioglu, C.H. Ecosystem functions and services. In Sodhi and Ehrlich: Conservation Biology for All. <http://ukcatalogue.oup.com/product/9780199554249.do>.
5. Koh, L.P and Gardner, T.A. Conservation in human-modified landscapes. <http://ukcatalogue.oup.com/product/9780199554249.do>
6. IUCN. (2012). *IUCN Red List Categories and Criteria: Version 3.1*. Second edition. Gland, Switzerland and Cambridge, UK: www.iucn.org/publications

7. Begon M, Townsend, CR. Ecology: from individuals to ecosystems, , Harper, JL (2006). Blackwell
8. Essentials of Ecology
<http://as.wiley.com/WileyCDA/WileyTitle/productCd-EHEP002937.html>

Field Guides and Natural History for the Library

1. Indian Mammals: A Field Guide - Vivek Menon
<http://www.amazon.in/Indian-Mammals-Field-Vivek-Menon/dp/9350097605>
2. Birds of the Indian Subcontinent - Grimmett, Inskipp and Inskipp
http://www.amazon.in/Birds-Indian-Subcontinent-Pakistan-Bangladesh/dp/819331509X/ref=sr_1_1?s=books&ie=UTF8&qid=1484189295&sr=1-1&keywords=birds+of+indian+subcontinent+grimmett
3. Butterflies of Peninsular India - Krushnamegh Kunte
https://www.amazon.in/Butterflies-Peninsular-India-Krushnamegh-Kunte-ebook/dp/B00AAGHCMS?_encoding=UTF8&keywords=indian%20butterflies%20kunte&qid=1484189351&ref_=sr_1_2&s=books&sr=1-2
4. Song of the Dodo - David Quammen
http://www.amazon.in/Song-Dodo-Island-Biogeography-Extinctions/dp/0684827123/ref=sr_1_1?s=books&ie=UTF8&qid=1484189401&sr=1-1&keywords=song+of+the+dodo
5. The Beak of the Finch - Jonathan Weiner
http://www.amazon.in/Beak-Finch-Story-Evolution-Time/dp/067973337X/ref=sr_1_1?s=books&ie=UTF8&qid=1484189425&sr=1-1&keywords=beak+of+the+finch