

## **C1A: Ecology**

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**Instructors:** G. Ravikanth (Co-Coordinator), Soubadra Devi, Abi Vanak (Co-Coordinator)/Aniruddha Marathe/Manvi Sharma

**Credits and contact hours:** 3 credits, 48 hours

**Class schedule:** Monday (10-10:50), Wednesday (10-10:50) and Friday (10-10:50 and 11-11:50) (Two classes on some Fridays)

#### **Course Description:**

This course is primarily designed for students with a background in the social sciences, or students from the natural sciences who have had no prior training in ecology. This introductory full semester core course will introduce students to basic principles in ecology with emphasis on its application. Students will learn about ecological concepts that apply at levels of the population, community and ecosystem: the relationship between organisms and their environment, interactions amongst organisms; patterns in the distribution of species and communities; and processes that underlie the functioning of ecosystems. The course will also draw upon case studies to illustrate the application of ecological concepts to conservation and sustainable use of resources. The course will also have special lectures and discussions on ecology and conservation.

Course evaluation: 2 exams (20+20), assignments (20), class participation (10), final (30)

## Course schedule (dates/day will be finalized shortly)

Sl. No	Date/ Day	Module	Lecture	Instructor
1	14-08-2019	<b>Introduction</b>	Introduction to Ecology: Its history, evolution from natural history and relevance in a human dominated world. Introduction to the idea of scales/and levels of organization.	<b>RK</b>
2	16-08-2019		The physical environment (soil, water, temperature)	<b>RK</b>
3	19-08-2019		Adaptations to the physical environment, drought and salt tolerance, C3/C4 species	<b>RK</b>
4	21-08-2019		Photosynthesis and climate	<b>RK</b>
5	23-08-2019		Natural Selection and Evolution	<b>RK</b>
6	26-08-2019	<b>Evolution</b>	Speciation, sexual selection and evolution, taxonomy and systematics	<b>RK</b>
7	28-08-2019		Life histories, evolutionary fitness and speciation-1	<b>RK</b>
8	30-08-2019		Life histories, evolutionary fitness and speciation-2	<b>RK</b>
9	04-09-2019		Sex and Evolution	<b>RK</b>
10	06-09-2019		Continuous Assessment (Quiz 1) 20 Marks	<b>RK</b>
11	09-09-2019 12-12:50	<b>Population Ecology</b>	Introduction to population ecology: What is a population? Population estimation	<b>ATV</b>
12	10-09-2019		Population processes. Life tables, Survivorship curves and simple models of population growth.	<b>AM/MS</b>

<b>13</b>	11-09-2019		Density dependency, r and K selected species	<b>AM/MS</b>
<b>14-15</b>	13-09-2019		Population dynamics: predator-prey interactions and other models AND Life histories, evolutionary fitness and speciation-1	<b>AM/MS</b>
<b>16</b>	16-09-2019		Life histories, evolutionary fitness and speciation-2	<b>AM/MS</b>
<b>17</b>	17-09-2019  12-12:50		Applied population ecology: managing populations, HW conflict.	<b>AM/MS</b>
<b>18</b>	18-09-2019		Biodiversity - measures, patterns at continental & global scales	<b>AM/MS</b>
<b>19-20</b>	20-09-2019		An introduction to population genetics AND Population genetics and its conservation implications (e.g., inbreeding depression and genetic drift; minimum viable population size).	<b>RK</b>
<b>21</b>	23-09-2019		Introduction to community ecology: What is an ecological community, competition, ecotones.	<b>AM/MS</b>
<b>22</b>	25-09-2019		Food webs, bottom-up and top-down control	<b>AM/MS</b>
<b>23 &amp; 24</b>	27-09-2019		Role of competition in shaping communities: real vs imaginary. AND Mutualism and predator prey interactions	<b>AM/MS</b>
<b>25</b>	30-09-2019		Species interactions and ecosystem services	<b>AM/MS</b>
<b>26</b>	04-10-2019	<b>Community Ecology</b>	Disturbance Ecology: Succession, restoration	<b>AM/MS</b>
<b>27</b>	09-10-2019		Community ecology and biogeography	<b>AM/MS</b>
<b>28</b>	11-10-2019		Behavioral Ecology	<b>AM/MS</b>
<b>29</b>	14-10-2019		CA2 Assignment (Population Dynamics) 20 Marks	<b>AM/MS</b>

<b>30</b>	16-10-2019		Introduction to the ecosystem concept. History/development of the concept.	<b>AM/MS</b>
<b>31</b>	18-10-2019		Carbon in ecosystems. Net and gross productivity. Controls on productivity, allocation, decomposition.	<b>AM/MS</b>
<b>32</b>	21-10-2019		Soils and nutrients. Plant controls on nutrient cycling through ecosystems.	<b>AM/MS</b>
<b>33</b>	23-10-2019		Mid-Term Exam (20 Marks)	<b>ATV/AM</b>
<b>34</b>	25-10-2019	<b>Ecosystems Ecology</b>	Biomes & climate – the global distribution of biomes	<b>SD</b>
<b>35</b>	28-10-2019		Ecosystems of India - humid tropical forests	<b>SD</b>
<b>36</b>	30-10-2019		Ecosystems of India – tropical dry forests	<b>SD</b>
<b>37</b>	04-11-2019		Ecosystems of India – grasslands and savannas	<b>SD</b>
<b>38</b>	06-11-2019		Ecosystems of India - tropical montane forests and sholas	<b>SD</b>
<b>39</b>	08-11-2019		Ecosystems of India - temperate coniferous, broadleaved forests, alpine meadows	<b>SD</b>
<b>40</b>	11-11-2019		Biodiversity and ecosystem functioning.	<b>SD</b>
<b>41</b>	13-11-2019		Managing and sustaining ecosystems. Resilience and alternative stable states. Social ecological systems.	<b>SD</b>
<b>42</b>	15-11-2019		Biodiversity - measures, patterns at continental & global scales	<b>SD</b>
<b>43</b>	18-11-2019		Biodiversity and Humans: species extinction, overexploitation, invasive species, global warming	<b>SD</b>
<b>44</b>	20-11-2019	<b>Conservation Biology and Sustainable</b>	Conservation of species and populations applied population ecology, sustainable harvest models	<b>SD</b>

		<b>Science</b>		
<b>45</b>	22-11-2019		Conservation of communities and ecosystems applied community & ecosystems ecology	<b>SD</b>
<b>46</b>	25-11-2019		Landscape fragmentation and species conservation: protected area	<b>SD</b>
<b>47</b>	27-11-2019		Conservation planning – prioritization, zoning.	<b>SD</b>
<b>48</b>	<b>29-11-2019</b>		Final Exam	<b>ATV/RK/SD</b>

ATV = Abi T. Vanak, AM = Aniruddha Marathe, MS = Manvi Sharma, RK = Ravikanth, SD = Soubadra Devy

### **Textbooks:**

1. *The Economy of Nature-Robert Ricklefs. (6 ed.) 2010.*<sup>[1]</sup><sub>[SEP]</sub>
2. *Ecology: Individuals to Ecosystems: Begon, Townsend and Harper (4 ed.) 2006.*
3. *Conservation Biology: A Primer for South Asia. Bawa, K.S. Richard Primack and Meera Oommen. 2010*