BIOL2010 Lecture concepts

Lecture /staff	Lecture	Concepts
1 MF	Introduction to BIOL2010	Introduction: goals of course, course structure (lectures, tutorials, practicals).
2 MF	Experimental methods in ecology	1. Definitions of Ecology. 2. Scientific method, importance of statistics, scientific rigor. 3. Ecological scales (spatial and temporal) 4. Experimentation and ecological study.
3 MF	Conditions and resources 1	1. Conditions and resources 2. Variations in conditions 3. Responses to variations in conditions; differences and interactions between organisms. 4. Interactions between conditions and resources
4 MF	Conditions and resources 2	1.Conditions and resources interact to determine the composition of communities 2. Terrestrial biomes; characteristics of the major types 3. Local factors introduce heterogeneity into biomes 4. Changes in conditions and resources can change over time 5. Basic comparisons between conditions and resource availability in terrestrial and aquatic environments.
5 MF	The ecological niche	1. Modern concept of ecological niche 2. Principles of interspecific competition 3. The competitive exclusion principle – appreciate its limitations 4. Importance of environmental heterogeneity 5. Niche complementarity
6 MF	Competition	1. Intraspecific competition 2. Density dependent mortality and fecundity 3. Meaning(s) of density 4. Population effects of intraspecific competition 5. Simple models for population growth incorporating intraspecific competition and their limitations 6. Impact of intraspecific competition on individuals
7 MF	The nature of predation	1. Classification of predation (taxonomic and functional) 2. Subtleties of predation: effects of true predators, grazers and parasites on prey fitness and abundance; interactions with other factors; compensation and defence (aposematism, Mullerian/ Batesian mimicry; plant defences) 3. Effects on individual prey and population 4. Value of optimal foraging theory
8 MF	Population dynamics of predation	1. Basic population dynamics of predator- prey interactions (simple models- limitations) 2. Functional responses 3 Numerical and aggregative responses 4. Predator behaviour 5. Effects of crowding
9 MF	Herbivory	1. Plants as sources of nutrition 2. Plant strategies to defend against herbivory (Direct, indirect; constitutive, inducible) 3. Inducible plant defences and plant fitness 4. Tritrophic interactionsand plant defences against herbivory

10 GW	How individuals interact with the environment	
11 GW	Life cycles and the environment 1	
12 GW	Life cycles and the environment 2	
13 GW	Environmental dynamics and organisms 1	
14 GW	Environmental dynamics and organisms 2	
15 GW	Organisms and adaptive change	
16 GW	Invasions	
17 MM	What is a community and how do we study them?	1. Review of what a biological community is. 2. How to study/categorise communities 3. Open and closed systems 4. Trophic levels 5. Food webs/interaction networks 6. How to break up communities for study 7. Rank abundance curves 8. Common diversity indices Species accumulation curves 9. Introduction to the importance of species interactions and review of the ecological niche in community context.
18 MM	Direct and indirect interactions among species	1. methods for measuring direct impacts of species on other species 2. different types of direct interactions 3. review of different types of species: keystone species, dominant species 4. ways to calculate impact of a species on a community (CI) 5. basics of network analyses
19 MM	Indirect interactions and ecosystem engineers	1. different types of indirect interactions 2. indirect facilitation 3. other types of indirect interactions
20 MM	Community assembly and diversity maintenance	1. Overview of what diversity means in ecological context 2. Define community assembly and break down of all the ecological processes involved explaining the role that each plays in assembly: dispersal, environmental filtering, competitive exclusion, facilitation. 3. Concept of functional traits and why they provide useful information about community assembly
21 MM	Community diversity and ecosystem function	1. Niche/resource partitioning 2. Storage effects 3. Broad overview of modern coexistence theory: niche differences and fitness differences 4. Ecosystem function 5. Biodiversity ecosystem function relationship: complementarity hypothesis, redundancy hypothesis, driver and passenger hypothesis 6. relationship between biodiversity and ecological resilience

22 MM	Community stability and change	1.What is succession 2. agents of change during succession 3. Primary succession 4. Secondary succession 5.Facilitation Model of Succession 6. Inhibition Model of succession 7. Tolerance Model of succession 8. Alternative Stable States
23 MM	Biogeography: drivers of global diversity patterns	1. Overview of main questions asked in Biogeography 2. Global patterns of diversity 3. Discussion of why there is more diversity in the tropics 4.Species-area relationship 5. Theory of Island Biogeography
24 MZ	Modelling in ecology	The use (and abuse) of models (conceptual, mathematical, statistical) in ecology. Particularly at a population level (distribution and abundance) but also going from behaviour to population consequences.
25 MZ	What is a population?	Defining populations in theory and practice, if we are to quantify and study them. Population changes in time and space.
26 MZ	Habitats	Defining and quantifying species "habitats" and their requirements to survive, reproduce and persist at a locality.
27 MZ	Habitats and movement	Combining resource use, habitat and species movement behavior. Migration, dispersal and foraging.
28 MZ	Sampling	Sampling to estimate species distribution and changes in abundance over time.
29 MZ	Life tables	Construction and interpretation of life tables.
30 MZ	Population dynamics 1	Population dynamics theory and interpretation. The great debate: regulation or persistence?
31 MZ	Population dynamics 2	