

Summer Ventures 2008 Mathematical Ecology

Course Information

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Assistants Carol Petricevic and Richard Peart

Program Description

The mathematical ecology group will study the mathematics of ecological processes and patterns such as population growth, competition among individuals and species, and how the environment affects the shape of organisms. We will spend time in the laboratory learning about intra- and inter-specific competition, and we will visit field sites to learn how organisms respond to different environments. We will investigate a variety of mathematical approaches for modelling ecological processes, ranging from the use of difference and differential equations to incorporating matrices and statistics. In addition to laboratory and field work, students will learn how to use mathematical and ecological modeling software to discover more about ecological processes and patterns. Students will work in small groups to design and implement a research project which will be based on a combination of the literature, field or laboratory data, and mathematical modelling. Graphical display of the data, and oral and written presentation of results will be part of every project.

Tentative Schedule

Week 1		
Sunday, June 15	3 p.m. Opening Ceremony 4 p.m. Picnic	Coulter Recital Hall WCU Picnic Shelter
Monday, June 16	Introduction to Modeling in Ecology Set up Duckweek (<i>Lemna</i>) Experiment	NS 118 & MK 129 NS 118 Lab
Tuesday, June 17	Blue Ridge Parkway Field Work Develop questions, notice patterns, possible data and/or sample collection	Meet in NS 118
Wednesday, June 18 (Half-day)	Plant Allometry (Geometry, Shape) Study and collect data on tree allometry; collect leaf samples	NS 118 WCU Campus
Thursday, June 19	Investigation of Scanned Leaf Images (Morning) – Introduce Herbivory Introduction to Individual Based Modeling (Afternoon)	NS 118 & Lab MK 129
Friday, June 20	Highlands Field Work Pollinator Investigation: Create artificial flowers, monitor pollination traffic, collect data	Meet NS 118
Saturday, June 21 (Half-day)	Foraging Discussion Foraging equation and individual based model implementing Friday's observations	NS 118 MK 129

Week 2		
Sunday, June 22		
Monday, June 23	Competition and Lotka-Volterra Introduce Parasitoid Wasp Experiment and Extend to Lotka-Volterra Check on <i>Lemna</i> Experiment (collect measurements)	NS 118 and NS 118 Lab
Tuesday, June 24	Project Determination Introduction to the library Proposal writing	NS 118 Hunter Lib.
Wednesday, June 25 (Half-day)	Start Projects (have electronic classroom if needed)	NS 118/Lab MK 129
Thursday, June 26	Continue work on projects (have access to busses if needed)	NS 118/Lab
Friday, June 20 (Half-day)	Continue work on projects (have electronic classroom if needed)	NS 118/Lab MK 129
Saturday, June 27	BREAK	

Week 3		
Sunday, June 29	Return from break	
Monday, June 30	Continue work on projects (have access to busses if needed)	NS 118/Lab
Tuesday, July 1	Continue work on projects (have access to busses if needed)	NS 118/Lab
Wednesday, July 2 (Half-day)	Continue work on projects (have electronic classroom if needed)	NS 118/Lab MK 129
Thursday, July 3	Continue work on projects (have access to busses if needed)	NS 118/Lab
Friday, July 4	Continue work on projects (have electronic classroom if needed)	NS 118/Lab MK 129
Saturday, July 5 (Half-day)	Continue work on projects	NS 118/Lab

Week 4		
Sunday, July 6		
Monday, July 7	Start working on presentations and papers (have access to busses if needed)	NS 118/Lab
Tuesday, July 8	Continue work on presentations and papers (have access to busses if needed)	NS 118/Lab
Wednesday, July 9 (Half-day)	Finish work on presentations and papers (have electronic classroom if needed)	NS 118/Lab MK 129
Thursday, July 10	Project Presentations to Group	NS 118
Friday, July 11	Project Presentations to All of SV	NS Auditorium
Saturday, July 12 (Half-day)	Closing ceremony	NS Auditorium