


Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9/5 Week 1 Intro to Ecosystems Science Noon: Picnic Welcome & Orientation 14:30 Speck (Rowe Lab) Pick up books, lab, field gear	9/6 8:30 Rowe Bldg Speck Auditorium Intro to Core Course 8:45-10:00 Giblin Earth as an Ecosystem: 4 Billion Years of Biogeochemistry 10:15-11:00 (Speck) Bonnie Kwiatkowski - Computer Orientation & Problem Solving 11:30-17:00 Lb 353, 357, 360 Suite Cardon Field Day: Forest Biomass	9/7 8:30-10:00 Melillo How Humans are Altering the Earth as an Ecosystem: The Global Carbon Cycle 10:15-noon Elective Modeling Starr 209 Microbial Loeb 353 13:15-14:15 Speck MBL Orientation/Safety 14:30-17:00 Lb 353 Ste Cardon Lab Forest Biomass Analysis, Leaf Area Measurement	9/8 8:30-10:00 Cardon I. The Ecosystems Concept: Energetics and Stoichiometry II. Physical Forcing: Climate, Micro-climate and Energy Balance 10:30-17:00 Foreman Lb 353 Ste Field Day; Aquatic Site Characterization & Biomass Lab 17:00 Return Field Trip Selection Form	9/9 8:30-10:00 Cardon Photosynthesis, Fates of Energy & Water Cycling 10:15-noon Elective 13:30-17:00 Foreman Lb 353 Ste Aquatic Lab Data Workup & Analysis	9/10 8:30-12:00 Cardon Foreman Initial Synthesis: Producer Biomass Problem Set Discussion & Wrap Up of Calculations. Students introduced to Center staff at Donuts. 13:30-15:00 Science Journalism (Speck) 15:15-16:00 Library Orientation	9/11 WHALE WATCH (SAT OR SUNDAY)  Depart SWOPE 9:00 for Provincetown, Dolphin Fleet Charter or Cape Cod Natl. Seashore hike
9/12 Week 2 Ecosystem Primary Production	9/13 8:00 Wk 1 Biomass Problem Set Due 8:30 Cardon Photosynthesis and Primary Production on Land 10:30-17:00 Cardon Field Day: Leaf Level CO ₂ Flux Measurements at Forest Sites	9/14 8:30-10:00 Forbrich Introduction to Eddy Covariance Method 10:15-noon Elective 13:30-17:00 Cardon Lab: NPP from Tree Cores; Leaf Areas and Data Work-up	9/15 8:30-10:00 Foreman Aquatic Primary Production 13:30 McHorney / Foreman Lab Work Pack Wk 1 CN Filters Process CN Wood / Leaf Material Wk 1/2	9/16 8:30-10:00 Gribble Harmful Algal Blooms & Use of Molecular Methods in Phytoplankton Ecology 10:15-noon Elective 13:30-17:00 Cardon Data Work-up; Forest NPP & GPP Return Wk 1 Prob Set	9/17 8:30-noon Cardon/ Foreman (Speck) Student-led Presentations: Terrestrial & Aquatic Primary Producer Biomass 13:30 SES Class Photo DSS 15:00-16:30 Dr. Chris Reddy, WHOI <i>Role of Science in Extreme Pollution Events</i>	9/18
9/19 Week 3 Fate of Organic Matter Produced on Land and Water 	9/20 8:00-noon Lb 208 Foreman Aquatic Lab / Field Day Primary production. Collect incubate & fix initial water samples Extract Chl a; Run CN filters from Week 1 biomass Lab (Waquoit, Johns Pond, West Falmouth, Siders Pond) 17:00 Primary Prod. Terr. Prob. Set due	9/21 8:30-10:00 Giblin Decomposition, Aerobic / Anaerobic Respiration, Redox Chemistry 10:15-noon Elective 13:30-17:00 Foreman Aquatic Primary Production Lab. Measure ΔO ₂ , Chl a in Phytoplankton; Start Calculations	9/22 8:30 -10:00 Ruff Chemolithotrophy Organic Matter Production in the Dark 13:30-17:00 Foreman Primary Production Lab Calculate Daily Rates of GPP, R, NCP; Scale to Pond / Bay. Finish Data Work-up	9/23 8:30-10:00 Melillo Litter Decomposition & Fate of Organic Matter on Land 10:15-noon Elective 13:30 Foreman Lab Work-up Data: Complete Calculations & Prepare Presentations Aquatic Primary Production	9/24 8:30-noon Cardon / Foreman (Speck) Students Present & Discuss Results of Primary Production Lab, Contrast P/B on Land and Water 13:30 – 15:00 Science Journalism	9/25 PIE KAYAKING FIELD TRIP (OPTIONAL) Depart 11:00 AM Return to MBL Sunday Afternoon
9/26 Week 4 Fate of Organic Matter in Ecosystems & Secondary Production	9/27 8:00 Aquatic Primary Prod. Lab Report due 8:30-10:00 Lloret Secondary Production Ecological Efficiency 10:30-17:00 Lloret/Roberson Field Day Trophic / Community Structure in Johns Pond, West Falmouth Harbor and Waquoit Bay	9/28 8:30-10:00 Lloret Use of Isotopes to Study Ecosystems 10:15-noon Elective 13:30-17:00 Lloret Lab Day Sorting, Identifying & Counting Organisms from Aquatic Sites	9/29 8:30-10:00 Ruff Microbial Food Webs and Consortia 13:30-17:00 Lloret Lab Day Finish Sorting, ID and Faunal Counts; Begin Calculations	9/30 8:30-10:00 Giblin The Nitrogen Cycle 10:15-noon Elective 13:30 Lloret Lab Prepare Isotope Samples, Complete Trophic Pyramids of Numbers, Biomass & Production.	10/1 8:30-noon Lloret Student-led Discussion Secondary Production and Trophic Pyramids. Synthesize Food Webs Data; Select Samples for Isotope Analysis DSS 15:00-16:30 Dr. Peter Frumhoff Union of Concerned Scientists <i>Global GeoEngineering</i>	10/2

SES PROGRAM CALENDAR – OCTOBER 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
10/3	10/4	10/5	10/6	10/7	10/8	10/9
Week 5 Ecosystem Stoichiometry and Biogeochemistry	8:00 Lab Report Due Trophic Pyramids 8:30-10:00 Perez Castro - Microbial Processes in Soils; Introduction to the Soils Lab 10:30-17:00 Perez Castro Terrestrial Field Day Soil Pits and Profiles, Soil Respiration; Begin Soil Extractions Distribute Midterm Study Questions	8:30-10:00 Giblin Acid Deposition, Charge Balance & Ion Exchange in Soils 10:15-noon Elective 13:30 McHorney Introduction to Nutrient Analysis – Detection Limit and Standard Curve Exercise	8:30-10:00 Giblin The Phosphorus Cycle 10:30-17:00 Giblin Aquatic Field Day Collect Sediment Sores Waquoit Bay; Sample & Profile Water Column at Siders Pond & Johns Pond	8:30-10:00 Giblin Stoichiometry of Ecosystems 10:15-noon Elective 13:30-17:00 Giblin Aquatic Lab Day Core Incubations. Analyze Pond water for DIC, metals, S ²⁻ , SO ₄ /Cl Foreman C/N Analysis: Pack Leaves, Soil, Wood	8:30-12:00 Lab McHorney/ Giblin Analyze Nutrients (NO ₃ , NH ₄ , PO ₄) from Waquoit Bay Core Incubations, Siders & Johns Pond Water Columns and Crane Forest Soil Extracts 13:30-14:30 McHorney Complete Nutrient Analysis. 15:00-17:00 faculty OPTIONAL Q & A Midterm Exam; Review	
10/10	10/11	10/12	10/13	10/14	10/15	10/16
Week 6 Nitrogen and Phosphorus Cycling & Budgets 	8:00-12:00 MID-TERM EXAM 15:30 –17:00 Science Journalism	8:30-10:00 Conte Sedimentation and Fate of Organic Matter in the Sea 10:15–noon Elective 13:30-17:00 Perez-Castro / McHorney LAB: Calculate soil Respiration; Begin Elemental Analysis of C/N in Wood, Leaves, Soils and Sediment	8:30-10:00 Pedrosa Pamies Extreme Weather Effects on Sedimentation & Plastics in the Sea 10:30-noon Foreman, TA's Discuss Project Ideas 13:30-17:00 Giblin Calculate Core Fluxes, Water Column Profiles DO, Nutrients, Metals, Sulfides, etc.	8:30-10:00 Foreman Coastal Nutrient Loading and Eutrophication 10:15–Noon Elective 13:30-15:30 Lloret / Foreman Falmouth Waste-Water Treatment Plant Tour & Introduction to Nitrogen Footprint	8:00 1st Project Concept Paper Due 08:30- noon Perez Castro / McHorney Calculate N & C Stocks in Soils, Trees & Litter and Estimate Nitrogen Mineralization DSS 15:00-16:30 Lauren Augustine NAS Gulf of Mexico Research Program	 Ferry Ride & Bike Trip Martha's Vineyard
10/17	10/18	10/19	10/20	10/21	10/22	10/23
Week 7 Unique Ecosystems Land-Water Interactions Lab Note: Meet with project mentors during next two weeks	8:30-noon Giblin/ Perez Castro Student-led Presentation Discussion Week 5-6 Ecosystem Stoichiometry & Fate of Organic Matter 13:30-15:00 Science Journalism	8:00 – Terrestrial Report Due Soil Respiration & N-mineralization 08:30 McHorney Project Procedures 10:15-noon Elective <div style="background-color: yellow; padding: 5px; text-align: center;"> Afternoon SES Faculty Project Mentor Planning Meetings </div>	8:00 Aquatic Report due Stoichiometry / Fate of Organic Matter in Aquatic Ecosystems 08:30-17:00 Lloret/Foreman Water & Nutrient Budget Lab Sample streams & groundwater, MASSTC (Massachusetts Alternative Septic System Test Center)	8:30-10:00 Lloret Nitrogen Footprints: Sustainability Metric for People and Institutions 10:15-noon Elective 13:30 Foreman / Lloret – Water & Nutrient Budget Lab; Sampling Soil Solution Water at Terrestrial Sites	8:30-Noon McHorney Nutrient Analysis NO ₃ , NH ₄ & PO ₄ in Rainfall, Soil Solution, Groundwater & Wastewater 13:30-17:00 Lloret/McHorney Calculations and Discussion for Nutrient Analysis	
10/24	10/25	10/26	10/27	10/28	10/29	10/30
Week 8 Do Species Matter?	8:30 Neill Deforestation in the Tropics 13:00-17:00 Hayn/ Lloret Nutrient H₂O Budget Lab - GIS/Nutrient Loading	8:30 Roberson What Species do in Ecosystems 10:15-noon- Elective 13:30-17:00 Lloret/ Foreman/McHorney Nutrient Loading and Budget Calculations	8:30 Roberson Coral Reefs & Global Change 13:30-17:00 Lloret / Foreman/McHorney Water & Nutrient Budget Lab Applied Science Scenarios & Report Preparation	8:30 Teichberg Ecosystem Restoration 10:15-noon Elective 17:00 –2nd Project Draft Proposal Due	8:30-noon Lloret / Foreman / McHorney Water Nutrient Budget Lab Student Discussion & Presentations. 15:00-16:30 Science Journalism	Cape Cod Marathon Relay Sunday 31st Students, Alumni vs. Faculty 

SES PROGRAM CALENDAR – NOVEMBER/DECEMBER 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
10/31 Week 9 Current Issues in Ecosystems Science <i>Cape Cod Marathon Relay / Post-Race Picnic</i>  Happy Halloween	11/1 8:00 Lab Rpt due: Cross-System Flux 8:30 Giblin Human Alteration of Global Element Cycles 10:30– noon Lloret/Otter Food Web Lab Isotope Lab tour / Nitrogen-Footprint calculation Noon-17:00 Lloret Isotopes and Food Web Data Work-up	11/2 8:30 Neill Loss of Ecosystems Services 10:15-noon Elective 13:30–17:00 Lloret /McHorney Food Web Lab Isotopes and Food Web Data Work-up and Discussion Return Draft Project Proposal Comments	11/3 8:30-noon Lloret Food Web Lab Discussion Presentation: Food Web / Isotope Data Distribute Study Question for Final Afternoon SES Faculty Project Mentor Planning Meetings	11/4 10:15-noon Elective 13:30-16:30 Q&A, Final Exam Review (optional)	11/5 8:30-noon Students Present Project Proposals and Preliminary Data DSS 15:00-16:30 Dr. Steward Pickett Cary Institute of Ecosystem Science Ecology of Segregation and Urban Ecosystems.	11/6
11/7 Week 10 DAYLIGHT SAVINGS TIME ENDS (GAIN HOUR)	11/8 8:00-12:30 FINAL EXAM	11/9 15:00 Final Written Project Proposal Due 15:30-17:00 Science Journalism	11/10 Project Work	11/11 8:30-12:00 Elective Project Work	11/12 Project Work	11/13 <i>Field Trip New England Aquarium / Boston</i>
11/14 Week 11	11/15 Project Work	11/16 Project Work	11/17 Project Work	11/18 Project Work	11/19 Project Work 15:30-17:00 Science Journalism	11/20
11/21 Week 12	11/22 Project Work	11/23 Project Work	11/24 Project Work	11/25  Thanksgiving Celebration	11/26	11/27
11/28 Week 13	11/29 Project Work	11/30 Project Work	12/1 Project Work	12/2 Project Work	12/3 Project Work 15:30-17:00 Science Journalism	12/4
12/5 Week 14	12/6 Project Work	12/7 Project Work	12/8 Project Work	12/9 Project Work	12/10 Project Work 15:30-17:00 Science Journalism	12/11
12/12 Week 15	12/13 Project Work 8:30 Project DRAFT Report Due	12/14 Project Work	12/15 Project Work 17:00 Draft Project Report Returned	12/16 Project Work	12/17 Student Research SYMPOSIUM Oral Project Reports	12/18
12/19 Week 16	12/20 Noon FINAL Project Report Due (written & electronic Word, Powerpoint, Excel)	12/21 End of Course Check out	12/22 	12/23	12/24	12/25