

Course Number	Title	Description	Credits
RGGS601	Phylogenetics Applications	This readings course will delve into the myriad ways in which phylogenetic methods are applied across the diversity of biological disciplines including their use for studying disease, ecology, conservation, population biology, genomics, anthropology, biog	3
RGGS602	GIS Methods and Applications	This course will focus on the application of Geographic Information Systems (GIS) to address questions relating to evolution and conservation. Students will gain hands-on experience with multiple GIS software packages, and will learn the fundamentals of s	2
RGGS603	Marine Zoological Biodiversity Surveys & Inventory	This course will familiarize students with the nature of the DEB-BSI granting panel priorities at the National Science Foundation with a focus on the broad zoological diversity in marine and associated environments. Passamaquoddy Bay, at the mouth of the	3
RGGS604	Understanding Biological Disparity	Disparity analyses attempt to characterize and explain extreme differences in morphology and diversity in closely related groups of organisms. Through group discussion of a series of contemporary readings covering both the fossil record and modern organi	3
RGGS605	Conservation Biology	This course, the first semester of a two-semester course, will serve as an introduction to the applied science of maintaining the Earth's biological diversity, landscapes, and wilderness. The course will focus on the biological principles relevant to the	1
RGGS606	Earth System Science	This course will survey Earth's dynamic systems and show how they have interacted through time to give the planet its present character. It will cover plate tectonics, the ocean/atmosphere system, and the global carbon and sulfur cycles. It will explore h	2
RGGS607	Sedimentology, Stratigraphy and Sedimentary Enviro	This course will describe the types of sediments distributed in modern environments of the Earth's surface and the physical and/or chemical processes that lead to their deposition. Earth's depositional environments will be presented in a plate tectonic co	2
RGGS608	Biological Diversification	This course will examine the patterns and processes of the diversification of life. Topics include species and speciation analysis, the rate-controls of speciation and extinction, understanding how biotas evolve, and explaining patterns of diversity throu	2
RGGS609	Molecular and Genome Evolution	This is a course in genome level evolutionary approaches. The course will examine the approaches and technology involved in genome level data collection and data analysis. Whole genome scans for population genetics and whole genome phylogenetics are two	3
RGGS610	Molecular Evolution	This course will focus on current paradigms of molecular evolution. These include the evolution of the genetic code, molecular clocks, and the measurement of selection and adaptation at the molecular level. The evolution of the genetic code will introduce	2
RGGS611	Parasitism	Parasitism is the most successful animal life-history strategy when one recognizes that every free-living animal species typically plays host to scores of associated parasites. This field course in practical parasitology will expose students to the enorm	3
RGGS612	Biogeographic Analysis	The course will explore historical biogeographic methods as well as how biogeography is relevant for answering questions within evolutionary biology, from speciation analysis to the origin of biotas and patterns of diversity. We will not take an ecologic	2
RGGS613	Arthropod Morphology	Students will investigate basic structural characteristics and theories of homology through selected readings in the literature and intensive laboratory work on exemplar organisms. Participation of multiple staff members will assist in the examination of	3
RGGS614	Higher-Level Relationships in the Arthropoda	This course will deal with the diversity and relationships of the Arthropoda. Units will cover living taxa in the Onychophora, Tardigrada, Chelicerata, Crustacea, Myriapoda, and Hexapoda. The extensive fossil record of arthropods will also be explored wit	1
RGGS615	Insect Diversity	As the most diverse lineage of living organisms, the Insecta will be examined down to the family-group level. Field, laboratory, and lecture components will allow for students to master skills in taxon recognition and understand the basis for existing cla	3
RGGS616	Metazoan Diversity	Taking a phylogenetic approach to the origins and diversification of animals, this course will cover the full scope of animal life from the origins of multicellularity through the major synapomorphies that unite and define the Tree of Life. This course wi	3
RGGS617	Digital Visualization Techniques	This course will be a hands-on course, under the direction of the MIF staff. Students will gain practical knowledge and experience using laser surface scanner and image processing software for volumetric data (MRI, CT, laser surface, confocal).	1
RGGS618	Microscopy	This course will be a hands-on course, under the direction of the MIF staff, where students will gain practical knowledge and experience using the confocal and electron microscopes. Topics will include sample preparation, use of equipment, image capture,	1
RGGS619	Molecular Techniques	This laboratory course will expose students to the basic techniques of evolutionary molecular analysis, including DNA extraction, primer design, PCR amplification, cloning, and sequencing. Basic sequence analysis will also be covered.	1

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RGGS620	Phylogenetic Algorithms	This course will cover the fundamental procedures and algorithms of systematic analysis. Tree construction (Wagner), refinement (SPR, TBR), simulated annealing, genetical algorithm, and character-optimization techniques will be examined in depth through a	1
RGGS621	Systematic Computation	This course will cover basic techniques in the use of computers in systematic analysis. It will be an introduction to operating systems, especially LINUX, scripting languages, and use of parallel computers. Several phylogenetic computer software packages	1
RGGS622	Bone Histology	This course will provide an introduction to both mechanical and interpretive aspects of analyzing fossil bone. It will introduce the identification of tissue types and their interpretation relative to specific hypotheses of growth, longevity, and life his	1
RGGS623	Fish Paleontology	This course will examine the origins and early radiations among primitive vertebrates ("fish"), especially the major gnathostome groups (chondrichthyans, osteichthyans, placoderms, and acanthodians). Aspects of modern vertebrate morphology, the fossil rec	2
RGGS624	Invertebrate Paleontology	This course will concentrate on one or more fossil invertebrate groups, emphasizing their morphology, evolutionary history biostratigraphy, and systematics. Study of actual specimens, drawing on the AMNH collections, will be an important part of the cour	2
RGGS625	Paleontology Field Methods	This will be a tutorial on how fossils are collected. This course may run concomitant with field expeditions.	1
RGGS626	Readings in Contemporary Paleobiology	This course will concentrate on the critical examination of recent studies in paleobiology. Students will be required to lead and participate in focused discussions.	1
RGGS627	Herpetology	This course will address the anatomical, ecological, and life history diversity of reptiles and amphibians. It will be structured around the evolutionary history of living and relevant fossil groups with special attention to scientific evidence.	3
RGGS628	Systematic Ichthyology	The course will be designed with the students' interests and needs in mind, and will be taught at an advanced level. Anatomically, the focus will be osteology, neurology, and myology (using various comparative approaches), and from a methodological/analy	3
RGGS629	Mammal Section/Vertebrate Morphology	Framed within an explicitly phylogenetic context, this course will provide students with an overview of mammalian musculoskeletal anatomy. Anatomical variation will be investigated utilizing a suite of exemplar taxa spanning the morphological diversity of	1
RGGS630	Mammalogy	This course will survey the structural, ecological, and behavioral diversity of extant mammals from an evolutionary perspective. Students will be expected to gain familiarity with all of the mammalian orders and the specializations associated with differe	3
RGGS631	Ornithology	This course will present an overview of avian history and evolution. Topics to be considered include origin of birds; avian phylogenetics, speciation, and biogeography; structural and functional evolution; general ecology; and behavior. Field trips will b	3
RGGS632	Ethnoscience Perspectives	Although their forms vary, classification and explanation of the natural world are human universals. "Ethnoscience" examines the epistemological bases and concrete applications of analytical procedures in non-Western cultures. Focusing on small-scale, "tr	1
RGGS633	Evolutionary Theory and Study of Culture Change	A number of anthropologists and archaeologists have used principles from evolutionary biology in their efforts to understand patterns of major culture change, such as the transition from hunting-gathering to agriculture, the emergence of social inequality	1
RGGS634	Natural Metaphors	In the words of Claude Levi-Strauss, natural species and elements are "good to think," providing a primary analogical scheme for human self-conceptions. What does it mean for the Bororo of Central Brazil to say, "We are red macaws," or for the Hopi of Ari	1
RGGS635	Insect Ecology and Conservation	This course will present an overview of the ecology and conservation of the Earth's most diverse group of organisms-insects. The first part of this course will cover ecological concepts as they apply to insects. How these concepts are applied to the conse	2
RGGS636	Isotope Geochemistry	This course will present the fundamentals of radiogenic and stable isotope systems. It will focus on those systems that most closely bear on global biogeochemical cycles, including the uranium-thorium-lead decay series, rubidium-strontium, carbon-14, and	2
RGGS637	How the Cosmos & Earth's History Affect Life	The complex phenomenon that we call life has evolved on an average planet, orbiting an average star, in a very humdrum part of the Milky Way galaxy. Is this an accident? Are there other abodes for life in our galaxy? How has the Earth's history driven the	1
RGGS638	Techniques in Earth Materials	This course will deal with minerals and organic compounds and how they are identified/analyzed to extract useful physical and chemical information. Applications include research on biomaterials, sediments, and sedimentary rocks. Analytical methodologies o	2
RGGS639	Arachnid Diversity	Arachnid Diversity will provide an overview of the orders of arachnids, including their interrelationships, natural history, systematics, and biogeography. Lectures and labs will enable students to become familiar with the most commonly encountered famili	2

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RGGS640	Hemipteran Phylogeny and Biology	This course will examine the classification and relationships of the Hemiptera down to the family-group level. Morphological, molecular, and biological data will be examined as a way of comprehending diversity and relationships. The extensive collections	2
RGGS641	Evolution of Eukaryotic Microbes	Although they may consist of just single cells, the eukaryotic microbes present fascinating studies in the evolution of life. This course will include discussions on the origins of organelles in eukaryotes, adaptations for motility, and phylogenetic relat	3
RGGS642	Microbial Diversity	This course will explore the diversity of microbial life, focusing on bacteria and archaea. Major groups of microbes will be covered along with the conceptual issues pertinent to how microbial diversity is studied. This course will include lectures and di	3
RGGS643	Virogenetics	The specifics of the placement of viruses in the Tree of Life remain enigmatic, and their monophyly is doubted by most. Following an introductory period focusing on traditional modes of viral classification (strandedness, morphology, and pathology), this	3
RGGS644	Molding and Casting	This will be a tutorial on how to construct molds for the replication of fossil materials.	1
RGGS645	Paleomammalogy	An introduction to the major features of mammalian evolution, this course will survey major groups of mammals, focusing on fossil taxa as well as the broader context of their relationships to living groups. We will focus on phylogeny, morphology biogeogr	2
RGGS646	Paleontology in the U.S. Western Interior	This intensive two-week field course/collecting expedition will travel to paleontological sites in the U.S. Northern Great Plains (Colorado, South Dakota, Wyoming, and Montana). Emphasis is on marine deposits containing invertebrate and vertebrate fossils	2
RGGS647	Reptile and Amphibian Paleontology	This course will be a general overview of the systematics and morphology of all nonsynapsid tetrapods. Special attention will be placed on the origins of extant groups. The course will consist of a detailed review of systematic patterns in these groups an	2
RGGS648	Actinopterygian Section/Vertebrate Morphology	Framed within an explicitly phylogenetic context, this course will provide students with an overview of actinopterygian musculoskeletal anatomy. Anatomical variation will be investigated utilizing a suite of exemplar taxa spanning the morphological divers	1
RGGS649	Fish Bioluminescence	Bioluminescence is a complex relationship between host fishes and luminescent bacteria. Recent work has shown that the phylogeny of bacteria and host are not necessarily congruent. Furthermore, methods of transmission are poorly understood. This course wi	1
RGGS650	Reptile & Amphibian Section/Vertebrate Morphology	Framed within an explicitly phylogenetic context, this course will provide students with an overview of amphibian and reptile musculoskeletal anatomy. Anatomical variation will be investigated utilizing a suite of exemplar taxa spanning the morphological	2
RGGS651	Vertebrate Biogeography of Madagascar	The unique vertebrate fauna of Madagascar is of great interest. This course will examine the origin of major groups of vertebrates of the island including taxa known only from the fossil record.	1
RGGS652	Anolis Lizards: Model System in Ecology and Evolutn	Anolis lizards are one of the most diverse and well studied groups of vertebrates and have long been a model system in ecology and evolutionary biology. This course will use the vast literature on these lizards to discuss topics such as adaptive radiatio	3
RGGS6521	Anolis Lizards 1 Credit Course	READINGS & DISCUSSION ONLY. The Anolis lizards of the New World tropics are one of the best-studied groups of vertebrates in evolution and ecology, making them a model system for adaptive radiation and island biogeography. The literature on this group is	1
RGGS653	How The Cosmos & Earth's History Affect Life	The complex phenomenon that we call life has evolved on an average planet, orbiting an average star, in a very humdrum part of the Milky Way galaxy. Is this an accident? Are there other abodes for life in our galaxy? How has the Earth's history driven the	1
RGGS654	Molecular and Genome Evolution		3
RGGS655	Advanced Invertebrate Zoology	The course will familiarize students with physiology, development and classification of each invertebrate phylum of the animal kingdom. The different topics will be discussed using scientific literature. Laboratory exercises will introduce students to div	3
RGGS655L	Advanced Invertebrate Zoology -- Lab		1