Course	Student Learning Outcomes	Method(s) of Assessment
ANATOMY PHYSIOLOGY		
ANAT 231 F General Human Anatomy	Upon successful completion of ANAT 231 F, General Human Anatomy, the student will be able to compare and contrast normal anatomy to abnormal anatomy associated with various diseases and conditions.	Common questions or problems Objective and essay questions on exams.
	Upon successful completion of ANAT 231 F, General Human Anatomy, the student will be able to identify histological and microanatomical structures.	Common questions or problems Laboratory practica.
	Upon successful completion of ANAT 231 F, General Human Anatomy, the student will be able to interrelate the structure and function of organs and organ systems.	Common questions or problems Objective and essay questions on exams and lab practica.
ANAT 240 F Human Physiology	Upon successful completion of ANAT 240 F, Human Physiology, the student will be able to compile and interpret data acquired in the laboratory.	Common questions or problems Written laboratory reports and essay questions on the exams.
	Upon successful completion of ANAT 240 F, Human Physiology the student will be able to relate how homeostatic mechanisms respond to internal and external changes in the environment.	Common questions or problems Multiple choice and essay questions on the exams.
	Upon successful completion of ANAT 240 F, Human Physiology the student will be able to compare and contrast normal physiological states and nonpathological varient states to pathophysiological conditions.	Common questions or problems Written laboratory reports and essay questions on the exams.
MICROBIOLOGY		
MICR 220 F Medical Microbiology	Upon successful completion of MICR 220 F, Medical Microbiology, the student will be able to apply basic microbiological principles and laboratory techniques.	Common questions or problems embedded in a final Microbiological principles are assessed primarily with objective and essay exams; laboratory techniques are assessed using written laboratory reports, laboratory practica, and successful identification of unknown microbes.

	Upon successful completion of MICR 220F, Medical Microbiology, the student will be able to outline the disease process and the immune response against infection.	Common questions or problems embedded in a final
	Upon successful completion of MICR 220 F, Medical Microbiology, the student will be able to identify unknown microorganisms using various differential and selective microbiological techniques.	Project assessed against a department standard Unknown microorganism identification project and report.
MICR 262 F General Microbiology	Upon successful completion of MICR 262 F, General Microbiology, the student will be able to apply appropriate laboratory techniques and scientific methodology to determine the identity of an unknown microorganism.	Project assessed against a department standard Unknown organism project in lab.
	Upon successful completion of MICR 262 F, General Microbiology, the student will be able to identify characteristics of microorganisms that scientists/medical professionals use to prevent and/or eliminate various pathogens.	Common questions or problems embedded in a final How microbiologists and medical professionals take advantage of differences between pathogens and the host cells/tissues is a concept that appears throughout the course; assessment of understanding occurs on multiple exams (both objective and written questions).
	Upon successful completion of MICR 262 F, General Microbiology, the student will be able to outline potential ways in which microorganisms and humans interact, including the disease process, immunology, medicine, nutrient cycles in the environment, and industrial application.	Common questions or problems embedded in a final Microbe-human interaction is a common theme throughout the course; assessment of understanding occurs on written exams where students are expected to be able to diagram these interactions.

Course	Student Learning Outcomes	Method(s) of Assessment
BIOLOGY		
BIOL 060 F	Deletion effective F12	

BIOL 100 F Principles of Biology	Upon successful completion of BIOL 100 F, Principles of Biology, the student will be able to identify cellular structures and the molecular components of which they are made and describe the functions of those structures.	Common questions or problems Exam questions, homework assignments and class group work will require the student to organize molecules into cell structures, arrange the cellular structures into a complete cell and discuss the activities of each structure in a cell.
	Upon successful completion of BIOL100F, General Biology, the student will be able to summarize the relationships between genetic variation, natural selection, and speciation in evolutionary terms.	Common questions or problems Various exam questions will require the students to connect small genetic changes with large evolutionary changes, clearly explaining the intervening linkages.
	Upon successful completion of BIOL100F, General Biology, the student will be able to evaluate the relationships between various components of an ecosystem.	Common questions or problems Written and oral classroom activities will require the student to evaluate and articulate the interactions occurring between abiotic and biotic components of ecosystems
BIOL 101 F General Biology	Upon successful completion of BIOL101F, General Biology, the student will be able to collect and analyze data using standard scientific techniques and methodology.	Various laboratory exercises require the collection and analysis of data.
	Upon successful completion of BIOL101F, General Biology, the student will be able to evaluate the relationships between various components of an ecosystem.	Written and oral classroom activities will require the student to evaluate and articulate the interactions occurring between abiotic and biotic components of ecosystems.
	Upon successful completion of BIOL101F, General Biology, the student will be able to summarize the relationships between genetic variation, natural selection, and speciation in evolutionary terms.	Various exam questions will require the students to connect small genetic changes with large evolutionary changes, clearly explaining the intervening linkages.
BIOL 101HF Honors General Biology	Upon successful completion of BIOL 101HF, Honors General Biology, the student will be able to discriminate between studies exhibiting good scientific process and those that do not.	Project assessed against a department standard Various laboratory exercises require the collection and analysis of data.

	Upon successful completion of BIOL 101HF, Honors General Biology, the student will be able to discriminate between studies exhibiting good scientific process and those that do not.	Essay/writing assignment assessed against a department standard Speech or presentation assessed against a department standard The students will give an oral presentation and produce a written report analyzing the marketing claims for some consumer products.
	Upon successful completion of BIOL 101HF, Honors General Biology, the student will be able to evaluate the relationships between various components of an ecosystem.	Common questions or problems Written and oral classroom activities will require the student to evaluate and articulate the interactions occurring between abiotic and biotic components of ecosystems.
BIOL 102 F Human Biology	Upon successful completion of BIOL 102 F, Human Biology, the student will be able to illustrate and describe how the systems of the body interact to maintain homeostasis.	Common questions or problems Homeostasis is an important theme in Human Biology; demonstrating application of the concept of homeostasis will be assessed using exam questions requiring students to interrelate organ systems.
	Upon successful completion of BIOL 102 F, Human Biology, the student will be able to explain how a cell's genetic information determines its various functions.	Common questions or problems
	Upon successful completion of BIOL 102 F, Human Biology, the student will be able to explain how human population growth relates to environmental concerns.	Common questions or problems Students will be assessed with exam questions requiring them to investigate novel methods of coping with increasing human population while conserving resources and minimizing negative environmental impact.
BIOL 102LF Human Biology Laboratory	Upon successful completion of BIOL 102LF, Human Biology Laboratory, the student will be able to identify the important anatomical structures of the human body.	Common questions or problems

BIOL 104 F Biology of Insects and Spiders	Upon successful completion of BIOL 104 F, Biology of Insects and Spiders, students will be able to identify, on sight, the major insect orders and selected spider families.	Common questions or problems Practical examination
	Upon successful completion of BIOL 104 F, Biology of Insects and Spiders, students will be able to compare and contrast the distinguishing physiological, morphological and behavioral characteristics of each of the major insect orders and select	Common questions or problems Practical examination
	Upon successful completion of BIOL 104 F, Biology of Insects and Spiders, students will be able to appraise both the beneficial and detrimental impact insects and spiders have in agriculture and human health.	Common questions or problems Practical examination
BIOL 108 F Plants and People	Upon successful completion of BIOL 108 F, Plants and People, the student will be able to identify major plant structures and their functions and describe the relationship between the two.	Common questions or problems Labeling of diagrams; multiple choice and essay exam questions
	Upon successful completion of BIOL 108 F, Plants and People, the student will be able to identify plants used by humans for food, drugs, habitation, etc. by sight and name them using their Latin names.	Common questions or problems Labeling of diagrams; multiple choice and essay exam questions
	Upon successful completion of BIOL 108 F, Plants and People, the student will be able to summarize the relationships between world conflicts, political movements, religious systems and slavery and the plants that were involved.	Common questions or problems Multiple choice and essay questions; term research paper
	Upon successful completion of BIOL 108 F, Plants and People, the student will be able to explain the relationship between the diet of human cultures and the nutritional content of foods available to them.	Common questions or problems Essay/writing assignment assessed against a department standard

	Upon successful completion of BIOL 108 F, Plants and People, the student will be able to describe the morphological and physiological changes that have occurred over time in plants used by humans and relate human selection pressures to those ch	Common questions or problems Essay/writing assignment assessed against a department standard
BIOL 109 F Genetics & Biotech in Society	Upon successful completion of BIOL 109 F, Genetics and Biotechnology in Society, the student will be able to analyze inheritance patterns and probabilities, using Punnett squares and pedigree analysis	Common questions or problems
BIOL 109LF Biotechnology Lab Techniques	Upon successful completion of BIOL 109LF, Genetics and Biotechnology in Society Lab, the student will be able to properly use typical laboratory equipment.	Skills demonstration or performance assessed against a department standard The students will perform experiments requiring them to demonstrate proficiency with various laboratory equipment, including balance, pH meter, spectrophotometer, microscope, micropipettes, DNA gel electrophoresis, autoclave
	Upon successful completion of BIOL 109LF, Genetics and Biotechnology in Society Lab, the student will demonstrate the ability to successfully transfer bacterial cultures using aseptic techniques	Skills demonstration or performance assessed against a department standard The students will transfer bacterial cultures throughout the course. Any problems will be seen as contaminated cultures.
	Upon successful completion of BIOL 109LF, Genetics and Biotechnology in Society Lab, the student will be able to isolate DNA using several different methods.	Skills demonstration or performance assessed against a department standard The students will use different methods to isolate DNA from various sources. The isolated DNA will be checked for purity and yield.
	Upon successful completion of BIOL 109LF, Genetics and Biotechnology in Society Lab, the student will be able to clone a gene into a plasmid, transform the recombinant plasmid into bacteria, and have the bacteria express the gene.	Skills demonstration or performance assessed against a department standard Assessment:The students will perform experiments requiring them to successfully clone a gene and demonstrate the expression of the gene in the recipient bacteria.

	Upon successful completion of BIOL 109LF, Genetics and Biotechnology in Society Lab, the student will be able to articulate their laboratory results to others.	Essay/writing assignment assessed against a department standard The students will complete laboratory reports for the various experiments. These will be evaluated based on format, clarity, accuracy, and completeness.
	Upon successful completion of BIOL 141 F, Marine Mammal Biology and Conservation, the student will be able to synthesize information from a variety of news, online, and scientific sources to provie a detailed summary of management approaches for the conservation of marine mammal species and their populations.	Common questions or problems
	Upon successful completion of BIOL 141 F, Marine Mammal Biology and Conservation, the student will be able to compare and contrast the specialized adaptations of marine mammals, particularly as they are related to their population fluctuations and conservation status.	Common questions or problems
BIOL 141 F Marine Mammal Biology and Conservation	Upon successful completion of BIOL 141 F, Marine Mammal Biology and Conservation, the student will be able to define terms and explain concepts related to the biology and conservation of marine mammals.	Common questions or problems
BIOL 170 F Organismal Biology	Upon successful completion of BIOL 170F, Organismal Biology, students will be able to demonstrate the proper use of various laboratory equipment	Common questions or problems Skills demonstration or performance assessed against a department standard Laboratory exercises and practical examinations will require students to demonstrate the proper use of equipment.

	Upon successful completion of BIOL 170F, Organismal Biology, students will be able to identify and classify organisms based upon their internal and external structures	Common questions or problems Laboratory practical examinations will require students to identify and classify organisms from the major taxonomic divisions of life.
	Upon successful completion of BIOL 170F, Organismal Biology, students will be able to use current evolutionary theory to explain the adaptive structure and function of living organisms.	Common questions or problems Questions on midterm and final exams will require students to explain the processes by which evolutionary adaptations can occur and evaluate the adaptive significance of the characteristics of living organisms.
BIOL 222 F Marine Biology	Upon successful completion of BIOL 222 F, Marine Biology, students will be able to identify, on sight, representative species of the major marine invertebrate phyla.	Common questions or problems
	Upon successful completion of BIOL 222 F, Marine Biology, the student will be able to describe the biological marine environment.	Common questions or problems
	Upon successful completion of BIOL 222 F, Marine Biology,the student will be able to summarize the physical marine environment on Earth historically (cosmology and exploration), geologically and chemically (seawater) including how drastic changes may cause phenomena such as El Niño.	Common questions or problems
BIOL 266 F General Zoology	Upon successful completion of Biology 266F students will be able to relate the evolution of adaptations to the structure, function and behavior of animals	Common questions or problems
	Upon successful completion of Biology 266F students will be able to distinguish the differences between animals through the dissection and detailed study of preserved specimens	Common questions or problems

	Upon successful completion of Biology 266F students will be able to synthesize information into a coherent concept of what an animal is; from a structural, physiological, behavioral, and holistic standpoint	Common questions or problems
BIOL 268 F General Botany	Upon successful completion of BIOL 268 F, General Botany, the student will be able to identify, classify and explain the evolutionary relationships of organisms from Kingdom Plantae and Kingdom Protista.	Common questions or problems
	Upon successful completion of BIOL 268 F, General Botany, the student will be able to describe the reproductive, morphological and physiological changes to the organisms in Kingdom Plantae during their evolution.	Common questions or problems
	Upon successful completion of BIOL 268 F, General Botany, the student will be able to identify, describe and differentiate among the structures of seed plants and their functions in maintaining the life of the plant.	Common questions or problems Project assessed against a department standard
BIOL 272 F Cell and Molecular Biology	Upon successful completion of BIOL 272 F Cellular and Molecular Biology, the students will be able to demonstrate an understanding of the major concepts in cell and molecular biology, and the experimental approaches taken to address them.	Common questions or problems Assessment of understanding is based on multiple exams with objective and subjective questions. Students are expected to write clear descriptions of course topics, and diagram processes and structures.
	Upon successful completion of BIOL 272 F Cellular and Molecular Biology, the students will be able to design, perform and analyse simple experiments in cell and molecular biology.	Project assessed against a department standard Students will be evaluated by a practicum on lab equipment use, a well-organized laboratory notebook, and detailed analysis in formal lab papers and Powerpoint/oral presentations. Skills demonstration or performance assessed against a department standard

BIOL 274 F General Ecology	Upon successful completion of BIOL 274F, General Ecology, students will be able to describe the biotic and abiotic factors that determine the distribution and abundance of organisms.	Questions on midterm and final exams will require students to explain the effects of climate, physiology, interspecific interactions, and life history on the distribution and abundance of organisms.
	Upon successful completion of BIOL 274F, General Ecology, students will be able to employ the scientific method in designing and completing a simple ecological research project.	Students will write and submit a report of their findings from a research project completed during a weekend field trip.
	Upon successful completion of BIOL 274F, General Ecology, students will be able to collect, identify, and properly curate biological specimens.	Each student will submit 25 specimens they have collected, identified, and curated.
BIOL 276 F Genetics & Evolutionary Bio	Upon successful completion of BIOL 276 F, Genetics and Evolutionary Biology, the student will be able to relate genotypes with phenotypes and predict the probabilities of inheritance using Punnett squares based on genotypic data.	The students will complete problem sets and exam questions using Punnett squares to determine genetic probabilities.
	Upon successful completion of BIOL 276 F, Genetics and Evolutionary Biology, the student will be able to interpret various forms of genetic data to determine the most likely form of inheritance.	The students complete assignments requiring the evaluation of genetic information to determine the type of inheritance.
	Upon successful completion of BIOL 276 F, Genetics and Evolutionary Biology, the student will be able to estimate gene locations based on recombination frequencies.	The students will complete assignments dealing with gene mapping using recombination frequency data.
	Upon successful completion of BIOL 276 F, Genetics and Evolutionary Biology, the student will be able to evaluate the effects of variable expressivity and incomplete penetrance on an individual’s phenotype.	The students will use information about the penetrance and expressivity of traits to predict the phenotypes of affected individuals.
	Upon successful completion of BIOL 276 F, Genetics and Evolutionary Biology, the student will be able to formulate, construct, and draw an accurate pedigree including appropriate phenotypic and genotypic data.	The students will complete problem sets and exam questions requiring the accurate drawing of complete pedigrees.

	Upon successful completion of BIOL 276 F, Genetics and Evolutionary Biology, the student will be able to determine the role of chance in deviation between expected and observed results.	The students will use chi-square analysis in various problems.
	Upon successful completion of BIOL 276 F, Genetics and Evolutionary Biology, the student will be able to assess the role of selection upon phenotypic changes.	The students will complete problems in which they will analytically determine the effect of selection on phenotypic changes over several generations.
BIOL 299 F Biol Science Indep Study	Upon successful completion of BIOL 299 F, Biological Science Indepedent Study, the student will be able to design a research project in a life sciences field using standard scientific methodology.	The student will work with a faculty mentor to develop and outline a project.
	Upon successful completion of BIOL 299 F, Biological Science Indepedent Study, the student will be able to execute the research project using techniques, equipment, and data collection as appropriate.	The student collects data/observations with assistance and training from the faculty mentor.
	Upon successful completion of BIOL 299 F, Biological Science Indepedent Study, the student will be able to interpret and analyze data and/or observations and draw conclusions regarding the question investigated.	The student will present the data and conclusions in a paper or other type of presentation.

Course	Student Learning Outcomes	Method(s) of Assessment
CHEMISTRY		
CHEM 100 F Chemistry for Daily Life	Upon successful completion of CHEM 100 F, Chemistry for Daily Life, students will be able to apply basic chemical principles to environmental and societal issues.	Common questions or problems
	Upon successful completion of CHEM 100 F, Chemistry for Daily Life, students will be able to evaluate the representation of science in popular media.	Common questions or problems
	Upon successful completion of CHEM 100 F, Chemistry for Daily Life, students will be able to design and conduct experiments using simple laboratory equipment.	Common questions or problems

	Upon successful completion of CHEM 100 F, Chemistry for Daily Life, students will be able to employ safe and proper handling and use of chemicals and equipment in the laboratory.	Common questions or problems
CHEM 101 F Introduction to Chemistry	Upon completion of CHEM 101 F Introduction to Chemistry, the student will be able to apply basic chemical principles related to medical applications.	Common questions or problems Examinations, quizzes, essay questions
	Upon completion of CHEM 101 F Introduction to Chemistry, the student will be able to identify inorganic, organic, and biological chemicals and their chemical names and typical reactions.	Common questions or problems Examinations, quizzes
	Upon completion of CHEM 101 F Introduction to Chemistry, the student will be able to apply quantitative analysis to solve unit conversion, mole concept, stoichiometry, and solution concentration problems.	Common questions or problems Examinations, quizzes, lab reports
	Upon completion of CHEM 101 F Introduction to Chemistry, the student will be able to employ the safe and proper handling and use of chemicals and equipment in the laboratory.	Common questions or problems
	Upon successful completion of CHEM 103 F, Chemistry in a Changing World, the student will be able to analyze common observations using basic chemical principles	Common questions or problems
	Upon successful completion of CHEM 103 F, Chemistry in a Changing World, the student will be able to design and conduct simple experiments using household materials.	Common questions or problems
CHEM 103 F Chemistry in a Changing World	Upon successful completion of CHEM 103 F, Chemistry in a Changing World, the student will be able to identify fundamental chemical principles.	Common questions or problems

CHEM 107 F Elementary Chemistry	Upon successful completion of CHEM 107 F, Elementary Chemistry, the student will be able to compute and solve introductory chemistry problems.	Common questions or problems
CHEM 111AF General Chemistry I	Upon successful completion of CHEM 111A, students will be able to 1) apply principles of	Common questions or problems
	Upon successful completion of CHEM 111AF General Chemistry I, students will be able to prepare an experiment in a laboratory notebook following scientific protocol.	Project assessed against a department standard Rubric common to all faculty for laboratory notebook assessment.
	Upon successful completion of CHEM 111AF General Chemistry I, students will be able to employ safe and proper handling of chemicals and equipment in the laboratory.	Common questions or problems Participation points in laboratory section for safety and proper handling of chemicals and equipment. Lab practical at the end of the semester.
CHEM 111BF General Chemistry II	Upon successful completion of CHEM 111BF General Chemistry, the student will be able to recognize patterns, formulate estimates, perform calculations, devise spreadsheets, employ graphical analyses, and design web searches to solve problems involving course topics.	Common questions or problems Quizzes, tests, research project, final exam.
	Upon successful completion of CHEM 111BF General Chemistry, the student will be able to demonstrate competence as an experimentalist, able to conduct laboratory experiments, operate scientific instruments, evaluate data utilizing computer technology, and maintain a laboratory notebook.	Project assessed against a department standard Rubric common to all faculty for laboratory notebook assessment, lab practicals, written laboratory exams, and identification of laboratory unknowns.
	Upon successful completion of CHEM 111BF General Chemistry, the student will be able to employ safe and proper handling of chemicals and equipment in the laboratory.	Common questions or problems Laboratory practicals.

CHEM 201 F Concepts Organic & Biochem	Upon successful completion of CHEM 201 F, Elementary Organic Chemistry, the student will be able to perform a variety of solution concentration calculations and apply these calculations to drug delivery procedures.	Common questions or problems
	The student will be able to diagram in molecular detail focusing on functional group reactions, the metabolic pathways of carbohydrates and fatty acids. Calculate the energy output of these pathways in the form of ATP molecules. Outline and summarize the flow of genetic information from DNA to RNA to protein on a molecular level and interpret how mutations affect these processes.	Common questions or problems
	Upon successful completion of CHEM 211AF, Organic Chemistry I, the student will be able to identify functional groups and relate physical properties to the structures of organic molecules.	Common questions or problems
	Upon successful completion of CHEM 211AF, Organic Chemistry I, the student will be able to follow basic laboratory techniques and utilize intrumentation to determine molecular structure.	Common questions or problems
CHEM 211AF Organic Chemistry I	Upon successful completion of CHEM 211AF, Organic Chemistry I, the student will be able to explain how molecular structure relates to reactivity.	Common questions or problems
CHEM 211BF Organic Chemistry II	Upon successful completion of CHEM 211BF, Organic Chemistry II, the student will be able to design and outline synthetic schemes for preparing organic molecules.	Common questions or problems
	Upon successful completion of CHEM 211BF, Organic Chemistry II, the student will be able to propose plausible stepwise mechanisms to reactions.	Common questions or problems

	Upon successful completion of CHEM 211BF, Organic Chemistry II, the student will be able to apply laboratory skills to determine molecular structure.	Common questions or problems
	Upon successful completion of CHEM 211BF, Organic Chemistry II, the student will be able to employ safe and proper handling of chemicals and equipment in the laboratory.	Common questions or problems

Course	Student Learning Outcomes	Method(s) of Assessment
ENVIROMENTAL SCIENCES		
ENVS 105 F Environmental Biology	Upon successful completion of ENVS 105 F Environmental Biology, the student will be able to explain the basic premises of scientific thinking and scientific approaches to problem solving. This includes powers of observation, honesty, skepticism, openness to new ideas, elimination of bias, formulation and testing of hypotheses.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 105 F Environmental Biology, the student will be able to differentiate between arguments based upon unsupported opinion, and arguments based upon scientific evidence.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 105 F Environmental Biology, the student will be able to organize and integrate concepts covered separately throughout the course, into a comprehensive understanding of how human-caused environmental changes are affecting global biological systems.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.

	Upon successful completion of ENVS 105 F Environmental Biology, the student will be able to explain why many environmental changes are not completely understood, and how this uncertainty often spawns varied, and sometimes conflicting explanations.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 105 F Environmental Biology, the student will be able to evaluate the merit of conflicting explanations for environmental problems.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 105 F Environmental Biology, the student will be able to create and justify reasonable, inter-disciplinary solutions to environmental problems.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
ENVS 105LF Environmental Biology Lab	Upon successful completion of ENVS 105 LF Environmental Biology Lab, the student will be able to recognize and justify local ecological communities in terms of climate, geography, human influence, and special adaptations possessed by natural residents.	Common questions or problems Student prepares written statements in the field. Student answers exam questions in the field and laboratory.
	Upon successful completion of ENVS 105 LF Environmental Biology Lab, the student will be able to formulate informed hypotheses to explain natural and unnatural landscapes encountered as the student travels in Southern California and elsewhere.	Common questions or problems Student prepares written statements in the field. Student answers exam questions in the field and laboratory.
	Upon successful completion of ENVS 105 LF Environmental Biology Lab, the student will be able to properly design, execute and analyze field and laboratory investigations that respond to basic ecological queries.	Common questions or problems Student prepares written report that describes the justification, design, procedures and results of investigations.

	Upon successful completion of ENVS 105 LF Environmental Biology Lab, the student will be able to list and identify common, conspicuous and unique species associated with local ecological communities.	Common questions or problems Student prepares written responses when presented with live or preserved specimens in the field or laboratory.
ENVS 106 F Conservation Biology	Upon successful completion of ENVS 106 F Conservation Biology, the student will be able to characterize the major patterns in global biodiversity over the last 600 million years.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 106 F Conservation Biology, the student will be able to analyze and explain the biological and ecological processes that influence the origin and extinction of species.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 106 F Conservation Biology, the student will be able to summarize and describe how biological science is being applied to help conserve biodiversity.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 106 F Conservation Biology, the student will be able to justify and advocate the value of biodiversity based on biological, ecological, ethical, and utilitarian perspectives.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 106 F Conservation Biology, the student will be able to identify the world's most endangered and threatened species and enumerate the causes of their declines.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.

	Upon successful completion of ENVS 106 F Conservation Biology, the student will be able to assess the costs, benefits and promise of different kinds of wildlife conservation programs.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
ENVS 106LF **Conservation** Biology Lab (course pending F13 at earliest)	Upon successful completion of ENVS 106 LF Conservation Biology Lab, the student will be able to recognize and explain local ecological communities in terms of climate, geography, human influence, and special adaptations possessed by natural residents.	Common questions or problems Student prepares written statements in the field. Student answers exam questions in the field and laboratory.
	Upon successful completion of ENVS 106 LF Conservation Biology Lab, the student will be able to formulate informed hypotheses to explain natural and unnatural landscapes encountered as the student travels in Southern California and elsewhere.	Common questions or problems Student prepares written statements in the field. Student answers exam questions in the field and laboratory.
	Upon successful completion of ENVS 106 LF Conservation Biology Lab, the student will be able to properly design, execute and analyze field and laboratory investigations that respond to basic ecological queries.	Common questions or problems Student prepares written report that describes the justification, design, procedures and results of investigations.
	Upon successful completion of ENVS 106 LF Conservation Biology Lab, the student will be able to identify locally and globally threatened and endangered species and enumerate the causes of their declines.	Common questions or problems Student prepares written responses when presented with live or preserved specimens in the field or laboratory.
	Upon successful completion of ENVS 106 LF Conservation Biology Lab, the student will be able to assess the costs, benefits, and promise of different kinds of in situ and ex situ conservation sttrategies for threatened and endangered species.	Common questions or problems Student prepares written statements in the field. Student answers exam questions in the field and laboratory.

ENVS 126 F Natural History of California	Upon successful completion of ENVS 126 F, Natural History of California, the student will be able to identify all of California's distinctive biological provinces and characterize them in terms of their dominant species, environmental settings and ecological dynamics.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 126 F, Natural History of California, the student will be able to justify the diverse biogeography of California in terms of climate, geology, geography and special adaptations possessed by natural residents.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 126 F, Natural History of California, the student will be able to formulate informed hypotheses to explain the natural landscape encountered as the student travels throughout California and elsewhere.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 126 F, Natural History of California, the student will be able to identify and categorize common, conspicuous and unique species associated with each of California's biological provinces.	Common questions or problems Written responses to homework assignments. Classroom or online chat room spoken responses to homework assignments. Examination questions. Classroom or online forum discussion.
ENVS 126LF Natural History of California Field Lecture	Upon successful completion of ENVS 126F F, Natural History of California Field Lecture, the student will be able to identify and indicate California’s dominant ecosystem types.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 126F F, Natural History of California Field Lecture, the student will be able to identify and indicate dominant, conspicuous and unique species associated with surrounding ecosystems.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.

	Upon successful completion of ENVS 126F F, Natural History of California Field Lecture, the student will be able to justify ecological community structures in terms of climate, geology, geography, environmental stresses, resource availability and special adaptations.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
ENVS 140 F Birds of Southern California	Upon successful completion of ENVS 140 F Birds of Southern California, the student will be able to locate and identify many species of birds common to Southern California.	Common questions or problems Project assessed against a department standard The student will respond to ongoing bird identification drills in the field. The student will prepare written answers to field quizzes. The student will prepare a written summary report of observations.
	Upon successful completion of ENVS 140 F Birds of Southern California, the student will be able to characterize identified birds in terms of their ecological niches.	Common questions or problems Project assessed against a department standard The student will respond to ongoing bird ecology drills in the field. The student will prepare written answers to field quizzes. The student will prepare a written summary report of observations.
ENVS 141 F Desert Natural History	Upon successful completion of ENVS 141 F Desert Natural History, the student will be able to recognize and justify desert ecological communities in terms of climate, geography, human influence, and special adaptations posessed by natural residents.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 141 F Desert Natural History, the student will be able to list and identify common, conspicuous, and unique species associated with desert ecological communities.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.

	Upon successful completion of ENVS 141 F Desert Natural History, the student will be able to formulate compelling scientific questions regarding the ecological state of subject desert environments.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 141 F Desert Natural History, the student will be able to design a field study that seeks to reveal information about the ecological state of subject desert environments.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 141 F Desert Natural History, the student will be able to execute a field study that is designed to answer compelling questions about the ecological state of subject desert environments.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field reports.
	Upon successful completion of ENVS 141 F Desert Natural History, the student will be able to analyze field study results and explain their meaning in terms of the original mission of the field study.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
ENVS 142 F Geology and Marine Biology of the Channel Islands	Upon successful completion of ENVS 142 F Geology and Marine Biology of the Channel Islands, the student will be able to characterize the current geologic organization of California's Channel Islands.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 142 F Geology and Marine Biology of the Channel Islands, the student will be able to explain the evolution of California's Channel Island geology in terms of modern geologic theory.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 142 F Geology and Marine Biology of the Channel Islands, the student will be able to characterize and compare the dominant marine ecosystems associated with California's Channel Islands.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.

	:Upon successful completion of ENVS 142 F Geology and Marine Biology of the Channel Islands, the student will be able to justify ecological community structures of California's Channel Islands in terms of physical settings, environmental stresses and resource availability.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
ENVS 143 F Baja California Field Studies	Upon successful completion of ENVS 143 F Baja California Field Studies, the student will be able to formulate compelling scientific questions regarding the ecological state of subject Baja California environments.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 143 F Baja California Field Studies, the student will be able to design a field study that seeks to reveal information about the ecological state of subject Baja California environments.	Common questions or problems Assessment:Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 143 F Baja California Field Studies, the student will be able to execute a field study that is designed to answer compelling questions about the ecological state of subject Baja California environments.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 143 F Baja California Field Studies, the student will be able to analyze field study results and explain their meaning in terms of the original mission of the field study.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
ENVS 144 F Marine Biology of Baja California	Upon successful completion of ENVS 144 F Marine Biology of Baja California, the student will be able to characterize and compare the dominant marine ecosystems in Baja California's coastal marine environments.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.

	Upon successful completion of ENVS 144 F Marine Biology of Baja California, the student will be able to justify ecological community structures of Baja California's coastal marine environments in terms of climate, geology, geography, environmental stresses, resource availability and special adaptations.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 144 F Marine Biology of Baja California, the student will be able to identify and indicate dominant, conspicuous and unique species associated with Baja California's coastal marine ecosystems.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
ENVS 145 F Marine Vertebrate Ecology of the Channel Islands	Upon successful completion of ENVS 145 F Marine Vertebrate Ecology of the Channel Islands, the student will be able to characterize and compare the dominant marine vertebrates associated with California’s Channel Islands.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 145 F Marine Vertebrate Ecology of the Channel Islands, the student will be able to identify and indicate dominant, conspicuous and unique vertebrate species associated with the Channel Island's marine ecosystems.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 145 F Marine Vertebrate Ecology of the Channel Islands, the student will be able to justify marine vertebrate community structures in terms of climate, geology, geography, environmental stresses, resource availability and special adaptations.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.

ENVS 170 F Astrobiology	Upon successful completion of ENVS 170 F Astrobiology, the student will be able to develop different scientifically-based scenarios explaining how life in different implementations might successfully exploit alternate planetary environments.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 170 F Astrobiology, the student will be able to develop and justify predictions about how life on alternate planetary environments might build, operate, maintain and reproduce itself by employing suites of elements, molecular styles, and biosynthetic processes that differ from those on Earth.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 170 F Astrobiology, the student will be able to compare and contrast alternate evolutionary schemes in terms of Darwinian evolution theory, reproduction with inheritance, dynamic heredity, type of information management, latencies of development, generational time frames, death, and immortality.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 170 F Astrobiology, the student will be able to locate and describe extreme environments on Earth where life is nonetheless present. Justify life in these extreme environments in terms of trade offs between opportunities and threats.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
	Upon successful completion of ENVS 170 F Astrobiology, the student will be able to evaluate the prospects for life on worlds with different host star qualities, different orbital circumstances, different planetary masses, different planetary surface environments, and different planetary geology.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.

	Upon successful completion of ENVS 170 F Astrobiology, the student will be able to synthesize a generic model for life on worlds in terms of biological services occurring within individuals, exploitation of environmental resources, evolution, dispersal and colonization, and long-term collective transformations of the global environment as a consequence.	Common questions or problems Written responses to homework study questions. Classroom or online chat room spoken responses to homework study questions. Examination questions. Classroom or online forum discussion.
ENVS 194 F Internship in Envirnomental Sciences/Newport Bay	Course deletion effective F12	
ENVS 196 F Regional Field Studies: Environmental Sciences	Upon successful completion of ENVS 196 F Regional Field Studies: Environmental Sciences, the student will be able to characterize and compare the dominant ecosystems associated with the subject destination's natural environment.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 196 F Regional Field Studies: Environmental Sciences, the student will be able to justify ecological community structures in terms of climate, geology, geography, environmental stresses, resource availability and special adaptations.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
	Upon successful completion of ENVS 196 F Regional Field Studies: Environmental Sciences, the student will be able to identify and indicate dominant, conspicuous and unique species associated with the subject destination's ecosystems.	Common questions or problems Written responses to situational exam questions posed while in the field. Discussions while in the field. Written field report.
ENVS 197 F Internship in Envirnomental Sciences/Environmental Concerns	Course deletion effective F12	

Course	Student Learning Outcomes	Method(s) of Assessment

EARTH SCIENCES		
ESC 100 F Physical Geology	Upon successful completion of ESC 100 F, Physical Geology, the student will be able to explain basic terms and concepts of geology.	Common questions or problems Objective and short-answer exams and essay homework assignments.
	Upon successful completion of ESC 100 F, Physical Geology, the student will be able to employ basic geologic concepts to make logical decisions dealing with geologic hazards and environmental issues.	Essay/writing assignment assessed against a department standard Evaluate living choices in reflective writings.
	Upon successful completion of ESC 100 F, Physical Geology, the student will be able to discriminate between studies exhibiting good scientific process from those that do not.	Project assessed against a department standard The student will produce a written report analyzing the geologic interpretations presented by different reports.
ESC 100LF Physical Geology Lab	Upon successful completion of ESC 100LF, Physical Geology Lab, students will be able to collect and analyze data based on standard scientific methodology.	Project assessed against a department standard Various laboratory exercises require the collection and analysis of data.
	Upon successful completion of ESC 100LF, Physical Geology Lab, students will be able to evaluate studies for adherence to proper scientific methodology.	Project assessed against a department standard The student will complete an assignment analyzing scenarios dealing with potential scientific conclusions using geologic maps, rocks and minerals.
	Upon successful completion of ESC 100LF, Physical Geology Lab, students will be able to compare and contrast plate tectonic settings with changes in plate motion and direction.	Project assessed against a department standard The student will complete an assignment using plate maps and movement history to determine plate action in the future.
ESC 101 F Earth Science Survey	Upon successful completion of ESC 101 F, Earth Science Survey, the student will be able to explain basic terms and concepts of Earth Science.	Common questions or problems Objective and short-answer exams and essay homework assignments.

	Upon successful completion of ESC 101 F, Earth Science Survey, the student will be able to employ basic Earth Science concepts to make logical decisions dealing with Earth processes such as weather conditions, geologic hazards, and environmental issues.	Essay/writing assignment assessed against a department standard Evaluate living choices in reflective writings.
	Upon successful completion of ESC 101 F, Earth Science Survey, the student will be able to discriminate between studies exhibiting good scientific process from those that do not.	Essay/writing assignment assessed against a department standard The student will produce a written analysis of Earth Science interpretations presented by different reports.
ESC 101LF Earth Science Survey Lab	Upon successful completion of ESC 101LF, Earth Science Survey Lab, students will be able to collect and analyze data based on standard scientific methodology.	Project assessed against a department standard Various laboratory exercises require the collection and analysis of data.
	Upon successful completion of ESC 101LF, Earth Science Survey Lab, students will be able to discriminate between studies of good scientific process and those that do not.	Project assessed against a department standard The student will complete an assignment analyzing scenarios dealing with potential scientific conclusions using maps, Earth materials, and field data.
	Upon successful completion of ESC 101LF, Earth Science Survey Lab, students will be able to compare and contrast plate tectonic settings with changes in plate motion and direction.	Project assessed against a department standard The student will complete an assignment using plate maps and movement history to determine plate action in the future.
ESC 102 F Survey of Natural Disasters	Upon successful completion of ESC 102 F, Survey of Natural Disasters, the student will be able to explain basic terms and concepts of related to the study of Natural Disasters.	Common questions or problems Objective and short-answer exams and essay homework assignments.
	Upon successful completion of ESC 102 F, Survey of Natural Disasters, the student will be able to employ basic Earth Science concepts to Natural Disasters and make logical decisions when dealing with processes such as earthquakes, volcanoes, hurricanes, landslides, and floods.	Essay/writing assignment assessed against a department standard Evaluate living choices in reflective writings.

	Upon successful completion of ESC 102 F, Survey of Natural Disasters, the student will be able to discriminate between studies exhibiting good scientific process from those that do not.	Essay/writing assignment assessed against a department standard The student will produce a written analyses of Natural Disaster interpretations presented by different reports.
ESC 103 F Historical Geology	Upon successful completion of ESC 103 F, Historical Geology, the student will be able to explain basic terms and concepts of Historical Geology.	Common questions or problems Objective and short-answer exams, essay homework assignments, laboratories, and field activities.
	Upon successful completion of ESC 103 F, Historical Geology, the student will be able to employ basic geologic concepts to make informed decisions when dealing with global cycles and geologic time.	Essay/writing assignment assessed against a department standard Evaluate living choices in reflective writings.
	Upon successful completion of ESC 103 F, Historical Geology, the student will be able to discriminate between studies exhibiting good scientific process from those that do not.	Essay/writing assignment assessed against a department standard The student will produce a written report analyzing the geologic interpretations presented by different reports.
ESC 104 F Geology of National Parks and Monuments	Upon succesful completion of ESC 104 F, Geology of the National Parks and Monuments, the student will be able to explain the history of the National Park system.	Common questions or problems Objective and short-answer exams and essay homework assignments.
	Upon succesful completion of ESC 104 F, Geology of the National Parks and Monuments, the student will be able to relate the plate tectonic theory to geologic settings of national parks.	Essay/writing assignment assessed against a department standard The student will produce a written report analyzing their geologic interpretations to the park's major geologic features.
	Upon succesful completion of ESC 104 F, Geology of the National Parks and Monuments, the student will be able to discriminate between studies exhibiting good scientific process from those that do not.	Common questions or problems Objective and short-answer exams and essay homework assignments.
ESC 105 F Elements of Meteorology	Upon successful completion of ESC 105 F, Introduction to Meteorology, the student will be able to explain the terms and concepts of meteorology.	Common questions or problems multiple choice, matching, fill-in-the-blank, crossword puzzles, short answer

	Upon successful completion of ESC 105 F, Introduction to Meteorology, the student will be able to interpret and use quantitative information, including maps, graphs, and tables.	Common questions or problems quantitative questions, map-graph-table reading and interpretation, worksheets, weather summaries, weather forecasts, home-weather activities
	Upon successful completion of ESC 105 F, Introduction to Meteorology, the student will be able to compose an effective presentation on one aspect of human efforts to protect Earth's atmosphere .	Essay/writing assignment assessed against a department standard Speech or presentation assessed against a department standard essay exams, short papers, oral presentations, student-produced videos
ESC 106 F Geology of the Orange County Area	Upon successful completion of ESC 106F, Geology of the Orange County Area, the student will be able to collect and analyze data on Orange County based on standard scientific methodology.	Project assessed against a department standard Various in-class and field exercises require the collection and analysis of data.
	Upon successful completion of ESC 106F, Geology of the Orange County Area, the student will be able to investigate various geology features and hazards that are specific to Orange County.	Essay/writing assignment assessed against a department standard Students demonstrate their ability to investigate various scenarios in-class and in the field by using accepted scientific principles. They will explain the results in a written report.
	Upon successful completion of ESC 106F, Geology of the Orange County Area, the student will be able to compare and contrast normal geologic processes and rates with those unique to Orange County.	Common questions or problems Multiple choice and essay questions on exams.
ESC 116 F Astronomy	Upon successful completion of ESC 116 F, Astronomy, the student will be able to demonstrate understanding of the motion of celestial bodies.	Common questions or problems Quizzes, exams, group activities, essays.
	Upon successful completion of ESC 116 F, Astronomy, the student will be able to explain how gravity is related to the formation and evolution of the solar system, stars, galaxies and the universe.	Common questions or problems Quizzes, exams, group activities, essays.

	Upon successful completion of ESC 116 F, Astronomy, the student will be able to explain how spectroscopy (electromagnetic radiation) is used to determine the properties of stars, galaxies and the universe.	Common questions or problems Quizzes, exams, group activities, essays.
ESC 116HF Honors Astronomy	Upon successful completion of ESC 116HF, Honors Astronomy, the student will be able to demonstrate understanding of the motion of celestial bodies	Common questions or problems Quizzes, exams, group activities, essays.
	Upon successful completion of ESC 116HF, Honors Astronomy, the student will be able to explain how gravity is related to the formation and evolution of the solar system, stars, galaxies and the universe.	Common questions or problems Quizzes, exams, group activities, essays.
	Upon successful completion of ESC 116HF, Honors Astronomy, the student will be able to explain how spectroscopy (electromagnetic radiation) is used to determine the properties of stars, galaxies and the universe.	Common questions or problems Quizzes, exams, group activities, essays.
ESC 116LF Astronomy Lab	Upon successful completion of ESC 116LF, Astronomy Laboratory, the student will be able to apply scientific reasoning to future astronomical discoveries.	Essay
	Upon successful completion of ESC 116LF, Astronomy Laboratory, the student will be able to use the scientific method in collecting data, formulating and testing a hypothesis.	Essays, laboratory reports
	Upon successful completion of ESC 116LF, Astronomy Laboratory, the student will be able to read, analyze and interpret data to draw valid scientific conclusions.	Laboratory reports, exams.
ESC 120 F Geology of California	Upon successful completion of ESC 120 F, Geology of California, the student will be able to explain basic terms and concepts of geology related to California.	Objective and short-answer exams and essay homework assignments.
	Upon successful completion of ESC 120 F, Geology of California, the student will be able to employ basic geologic concepts to make logical decisions dealing with geologic hazards and environmental issues.	Evaluate living choices such as eathquake-safe homesites and other geologic hazard assessments in analytical reports.

	Upon successful completion of ESC 120 F, Geology of California, the student will be able to discriminate between studies exhibiting good scientific process from those that do not.	The student will produce a written report analyzing the geologic interpretations presented by different reports.
ESC 130 F Introduction to Oceanography	Upon successful completion of ESC 130 F, Introduction to Oceanography, the student will be able to define terms and explain concepts of geological, physical, chemical, and biological oceanography.	Common questions or problems multiple choice, matching, fill-in-the-blank, crossword puzzles, short answer, essay exams
	Upon successful completion of ESC 130 F, Introduction to Oceanography, the student will be able to use the terms and concepts of oceanography to explain one aspect of the world ocean.	Common questions or problems multiple choice, matching, fill-in-the-blank, crossword puzzles, short answer, essay exams, short papers, oral presentations
	Upon successful completion of ESC 130 F, Introduction to Oceanography, the student will be able to interpret and apply quantitative information, including maps, graphs, and tables of data.	Common questions or problems quantitative questions, map-graph-table reading and interpretation, worksheets
ESC 130HF Honors Introduction to Oceanography	Upon successful completion of ESC 130HF, Honors Introduction to Oceanography, the student will be able to explain the terms and concepts of geological, physical. chemical, and biological oceanography.	Common questions or problems multiple choice, matching, fill-in-the-blank, crossword puzzles, short answer, essay exams
	Upon successful completion of ESC 130HF, Honors Introduction to Oceanography, the student will be able to give examples of the interaction between Earth processes and the world ocean.	Common questions or problems multiple choice, matching, fill-in-the-blank, crossword puzzles, short answer, essay exams, short papers, oral presentations
	Upon successful completion of ESC 130HF, Honors Introduction to Oceanography, the student will be able to interpret and use quantitative information, including maps, graphs, and tables.	Common questions or problems quantitative questions, map-graph-table reading and interpretation, worksheets

	Upon successful completion of ESC 130HF, Honors Introduction to Oceanography, the student will be able to compose argumentative essays and term papers using scientific evidence, analysis, and interpretation	Essay/writing assignment assessed against a department standard essay exams, short papers, term papers, oral presentations
	Upon successful completion of ESC 130HF, Honors Introduction to Oceanography, the student will be able to evaluate efforts to protect the world ocean through environmental activism and education of others.	Essay/writing assignment assessed against a department standard Speech or presentation assessed against a department standard essay exams, short papers, term papers, oral presentations
	Upon successful completion of ESC 130HF, Honors Introduction to Oceanography, students will be able to compose an essay that describes and communicates the complex scientific, environmental, social, and political issues that emerge from ocean c	Essay/writing assignment assessed against a department standard Speech or presentation assessed against a department standard
ESC 130LF Introduction to Oceanography Field Experience	Upon successful completion of ESC 130 F, Introduction to Oceanography Field Experience, the student will be able to demonstrate proficiency with field and laboratory methods for sampling, observing, and measuring properties of seawater.	Common questions or problems Lab practicum
	Upon successful completion of ESC 130 F, Introduction to Oceanography Field Experience, the student will be able to analyze and process data in tables and graphs.	Project assessed against a department standard Oral and written presentations
	Upon successful completion of ESC 130 F, Introduction to Oceanography Field Experience, the student will be able to relate scientific information to others in written and spoken forms.	Essay/writing assignment assessed against a department standard Speech or presentation assessed against a department standard
ESC 133 F Navigation & Seamanship	Course deletion pending F13	

ESC 140 F Geology of California Coastal Areas	Upon successful completion of ESC 140 F, Geology of California Coastal Areas, the student will be able to collect and analyze data based on standard scientific methodology.	Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 140 F, Geology of California Coastal Areas, the student will be able to evaluate the relationship between geologic features resulting from various geologic processes.	Written and oral activities will require the student to evaluate and articulate the geologic feature resulting from a specific geologic process.
	Upon successful completion of ESC 140 F, Geology of California Coastal Areas, the student will be able to summarize the relationship between wave and longshore current patterns with coastal landform features and sand deposition.	Various field activities will involve the student in making current measurements and relating it to changes in sand compostion and size.
ESC 141 F Geology of the Anza-Borrego Desert State Park Area	Upon successful completion of ESC 141 F, Geology of the Anza-Borrego Desert State Park Area, the student will be able to collect and analyze data based on standard scientific methology.	Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 141 F, Geology of the Anza-Borrego Desert State Park Area, the student will be able to discriminate between studies exhibiting good scientific process and those that do not.	The student will complete an assignment analyzing scenarios dealing potential scientific conclusions.
	Upon successful completion of ESC 141 F, Geology of the Anza-Borrego Desert State Park Area,, the student will be able to discriminate what geologic features were produced by a particular geologic process.	The student will complete an assignment comparing the geologic feature with the geologic map to make sound scientific conclusions.
ESC 142 F Geology of Mojave Desert Area	Upon successful completion of ESC 142F, Geology of Mojave Desert Area, the student will be able to collect and analyze data based on standard scientific methodology.	Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 142F, Geology of Mojave Desert Area, the student will be able to descriminate different rock types and landforms.	Field exercise requires students to determine rock types and relate them to specific landforms.

	Upon successful completion of ESC 142F, Geology of Mojave Desert Area, the student will be able to discriminate between studies exhibiting good scientific process and those that do not.	The student will complete an assignment analyzing scenarios dealing with potential scientific conclusions.
ESC 143 F Geology of the Owens Valley/Mammoth Lakes Area	Upon successful completion of ESC 143F, Geology of the Owens Valley/Mammoth Lakes Area, the student will be able to collect and analyze data based on standard scientific methodology.	Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 143F, Geology of the Owens Valley/Mammoth Lakes Area, the student will be able to discriminate between studies that follow good scientific process and those that do not.	The student will complete an assignment analyzing scenarios dealing with potential scientific conclusions with their own geologic observations.
	Upon successful completion of ESC 143F, Geology of the Owens Valley/Mammoth Lakes Area, the student will be able to recognize different rock types and landform features.	The student will complete an assignment identifying various rock types and matching it to that specific geologic feature.
ESC 144 F Geology of the Southern California Mountain Areas	Upon successful completion of ESC 144F, Geology of the Southern California Mountain Areas, the student will be able to collect and analyze data based on standard scientific methodlogy.	Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 144F, Geology of the Southern California Mountain Areas, the student will be able to discriminate between studies exhibiting good scientific process and those that do not.	The student will complete an assignment analyzing scenarios dealing with potential scientific conclusions with their own geologic observations.
	Upon successful completion of ESC 144F, Geology of the Southern California Mountain Areas, the student will be able to identify various rock types and relate it to a specific geologic feature.	The student will complete an assignment to identify rock types and compare them to the geologic map of the area.
ESC 145 F Geology of the Death Valley National Park Area	Upon successful completion of ESC 145F, Geology of the Death Valley National Park Area, the student will be able to collect and analyze data based on standard scienitific methodology.	Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 145F, Geology of the Death Valley National Park Area, the student will be able to identify rock types and relate them to specific landforms.	The student will complete an assignment to determine rock types and how they form specific landforms.

	Upon successful completion of ESC 145F, Geology of the Death Valley National Park Area, the student will be able to compare and contrast climate to paticular weathering processes.	Written field reports performed individually and in groups.
ESC 146 F Geology of the Joshua Tree National Park Area	Upon successful completion of ESC 146F, Geology of the Joshua Tree National Park Area, the student will be able to collect and analyze data based on standard scientific methodology.	Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 146F, Geology of the Joshua Tree National Park Area, the student will be able to identify rock types and relate them to specific landforms.	The student will complete an assignment where they relate a rock type with a specific geologic landform and geologic map.
	Upon successful completion of ESC 146F, Geology of the Joshua Tree National Park Area, the student will be able to recognize weathering desert processes to park setting.	The student will write a report detailing the various weathering processes seen in the field.
ESC 147 F Geology of the Colorado Plateau Areas	Upon successful completion of ESC 147 F, Geology of the Colorado Plateau Areas, the student will be able to collect and analyze data based on standard scientific methodology.	Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 147 F, Geology of the Colorado Plateau Areas, the student will be able to relate how rock types relate to specific geologic landforms.	The student will write a field report.
	Upon successful completion of ESC 147 F, Geology of the Colorado Plateau Areas, the student will be able to compare and contrast geologic processes in various geologic settings.	The student will construct graphs and diagrams that detail those geologic processes and how they developed in these geologic settings.
ESC 180 F Modern Techniques in Sampling	Course deletion pending F13	
ESC 190 F Environmental Geology	Upon successful completion of ESC 190F, Environmental Geology, the student will be able to collect and analyze data based on standard scientific methodology.	Project assessed against a department standard Various class exercises and projects require the collection and analysis of data.

	Upon successful completion of ESC 190F, Environmental Geology, the student will be able to demonstrate an understanding between plate tectonics and geologic hazards.	Common questions or problems Quiz and exam questions will require an understanding of the relationship between plate tectonic setting and recognizing specific geologic hazards.
	Upon successful completion of ESC 190F, Environmental Geology, the student will be able summarize how human activiites and consumption rates have caused environmental degradation and a resource crisis.	Common questions or problems Various exam questions and class projects require the students to evalute resource needs and consequences.
ESC 196 F Regional Field Studies in Geology	Upon successful completion of ESC 196 F, Regional Field Studies in Geology, the student will be able to collect and analyze data based on standard scientific methodology.	Project assessed against a department standard Various field exercises require the collection and analysis of data.
	Upon successful completion of ESC 196 F, Regional Field Studies in Geology, the student will be able to discriminate between studies demonstrating good scientific process from those that do not.	Project assessed against a department standard The student will complete an assignment analyzing scenarios dealing with a variety of scientific conclusions to determine which one best fits.
	Upon successful completion of ESC 196 F, Regional Field Studies in Geology, the student will be able to recognize rock types and relate them to specific landform features.	Project assessed against a department standard The student will write a report that describes rock types and landforms.

Course	Student Learning Outcomes	Method(s) of Assessment
FOOD/NUTRITION		
FOOD 060 F Foods for Fitness	Upon successful completion of FOOD 060 F, Foods for Fitness, the student will be able to plan and prepare meals which support the Dietary Guidelines for Americans.	Wrtitten laboratory evaluations and exam questions
	Upon successful completion of FOOD 060 F, Foods for Fitness, the student will be able to use nutrition knowledge to make healthy food choices.	Assessment:Exam questions

	Upon successful completion of FOOD 060 F, Foods for Fitness, the student will be able to apply nutrition principles to personal diet, fitness and health goals.	Assessment:Written assignments and exam questions
FOOD 070 F Nutrition Concepts and Food Preparation for Vegetarians	Upon successful completion of Foods 070 F, Nutrition Concepts and Food Preparation for Vegetarians, the student will be able to: Identify the components of a healthy diet as defined by the current Dietary Guidelines for Americans.	Exam questions, classroom and laboratory Projects
	Upon successful completion of Foods 070 F Nutrition Concepts and Food Preparation for Vegetarians, the student will be able to: Apply food safety and sanitation principles.	Assessment:Laboratory performance, exams, laboratory projects
	Upon successful completion of Foods 070 F Nutrition Concepts and Food Preparation for Vegetarians, the student will be able to: Apply fundamental food preparation principles and techniques to produce quality vegetarian cuisine.	Exams, classroom and laboratory projects, laboratory performance
	Upon successful completion of Foods 070 F Nutrition Concepts and Food Preparation for Vegetarians, the student will be able to: Demonstrate the ability to plan meals which meets the recommendations for a healthy diet as defined by the current Dietary Guidelines for Americans.	Exams, classroom and laboratory projects, analysis of one-day diet
FOOD 101AF Introduction to Foods	Upon successful completion of FOOD 101AF, Introduction to Foods, the student will be able to apply appropriate scientific principles to determine the correct preparation methods for each of the major categories of foods.	Exams and quizzes, laboratory worksheets, practicum.
	Upon successful completion of FOOD 101AF, Introduction to Foods, the student will be able to outline the steps that need to be taken to ensure maintenance of mandated sanitary standards in food preparation areas.	Exams and quizzes, instructor observation.
	Upon successful completion of FOOD 101AF, Introduction to Foods, the student will be able to assess the quality of a wide variety of prepared foods utilizing generally accepted industry standards.	Exams and quizzes, laboratory worksheets, practicum.

FOOD 101BF Introduction to Food Management	Upon successful completion of FOOD 101BF, Introduction to Food Management, the student will be able to apply appropriate scientific principles to determine the correct preparation methods for each of the major categories of foods.	Exams and quizzes, individual and group laboratory projects.
	Upon successful completion of FOOD 101BF, Introduction to Food Management, the student will be able to construct, execute and evaluate meals that meet established nutrition standards for various groups within the population while simultaneously providing an aesthetically pleasing experience.	Instructor evaluation of individual and group laboratory projects and computer analyses. Exams.
	Upon successful completion of FOOD 101BF, Introduction to Food Management, the student will be able to construct, execute and evaluate meals that meet pre-determined limits of time, money and human energy.	Instructor evaluation of individual and group work plans, cost analyses and assessments. Exams.
FOOD 130 F Cultural Aspects of Food	Upon successful completion of Food 130 F Cultural Aspects of Food, the student will be able to describe the functions of foods within a culture.	Exams, quizzes, laboratory reports and instructor-assigned activities
	Upon successful completion of Food 130 F Cultural Aspects of Food, the student will be able to discuss food customs and traditions among diverse groups in the United States.	Exams, quizzes, laboratory reports, oral and written report of cultural background
	Upon successful completion of Food 130 F Cultural Aspects of Food, the student will be able to analyze how food customs impact the nutritional status of people.	Exams, quizzes, laboratory reports, oral and written report of cultural background.
	Upon successful completion of Food 130 F cultural Aspects of Food, the student will be able to apply food safety and sanitation principles.	Assessment:Laboratory performance, exams and quizzes
NUTR 210 F Human Nutrition	Upon successful completion of NUTR 210 F Human Nutrition, the student will be able to differentiate among dietary choices and identify choices that reflect the current Dietary Guidelines for Americans.	Common questions or problems embedded in a final

	Upon successful completion of NUTR 210 F Human Nutrition, the student will be able to explain nutrient needs during the various stages of the human life cycle.	Common questions or problems embedded in a final
	Upon successful completion of NUTR 210 F Human Nutrition, the student will be able to explain how diet and lifestyle choices impact health and quality of life.	Project assessed against a department standard Diet analysis project and exam questions
	Upon successful completion of NUTR 210 F Human Nutrition, the student will be able to evaluate the validity of nutrition-related claims in the media and Internet.	Essay/writing assignment assessed against a department standard

Course	Student Learning Outcomes	Method(s) of Assessment
HEALTH EDUCATION		
HED 140 F Health Science	Upon successful completion of HED 140 F, Health Science, the student will be able to explain basic health concepts.	Common questions or problems embedded in a final Objective and short-answer exams.
	Upon successful completion of HED 140 F, Health Science, the student will be able to employ basic health concepts to make logical decisions concerning the health of their body.	Essay/writing assignment assessed against a department standard Evaluate lifestyle choices in reflective writings and questionaires.
	Upon successful completion of HED 140 F, Health Science, the student will be able to employ electronic media resources to investigate health issues.	Project assessed against a department standard Research an issue of current concern and evaluate in a paper or on a short-answer exam.
HED 197 F Internship in Health Education	Upon successful completion of HED 197 F, Internship in Health Education, the student will be able to compose a written criteria of the standards and objectives required for allied health field career choices based on internship experience.	Essay/writing assignment assessed against a department standard Instructor will collect and evaluate written assignment listing standards and objectives in the areas of education required, level of entry, and professional acumen.
	Upon successful completion of HED 197 F, Internship in Health Education, the student will be able to demonstrate the skills necessary to perform selected jobs in the allied health fields.	Skills demonstration or performance assessed against a department standard Instructor will collect and document progress reports from the immediate internship supervisor.

	Upon successful completion of HED 197 F, Internship in Health Education, the student will be able to diagram the procedures necessary to acquire a position in allied health fields.	Essay/writing assignment assessed against a department standard The student generates a procedural paper that is evaluated for completeness, effectiveness, application, and grammar.

Course	Student Learning Outcomes	Method(s) of Assessment
HORTICULTURE		
HORT 001 F Principles of Horticulture I	Upon successful completion of HORT 001 F, Principles of Horticulture I, the student will be able to distinguish and explain the differences between major plant groups (ferns, conifers, flowering monocots and flowering dicots).	Common questions or problems embedded in a final
	Upon successful completion of HORT 001 F, Principles of Horticulture I, the student will be able to distinguish and explain the characteristics of popular landscape styles utilized in Southern California landscapes.	Common questions or problems embedded in a final
	Upon successful completion of HORT 001 F, Principles of Horticulture I, the student will be able to compare and contrast the various landscape usages for ornamental plants.	Common questions or problems embedded in a final
	Upon successful completion of HORT 001 F, Principles of Horticulture I, the student will be able to interpret the results of a soil texture and nutrient test and explain their affects on plant growth.	Common questions or problems embedded in a final
HORT 002 F Principles of Horticulture II	Upon successful completion of HORT 002 F, Principles of Horticulture II, the student will be able to explain and differentiate the methods of propagation used the nursery industry.	Common questions or problems embedded in a final

	Upon successful completion of HORT 002 F, Principles of Horticulture II, the student will be able to devise a strategy for controlling weeds in landscaped areas using cultural and chemical methods of control.	Common questions or problems embedded in a final
	Upon successful completion of HORT 002 F, Principles of Horticulture II, the student will be able to select appropriate controls for commonly encountered insects found in Southern California landscapes.	Common questions or problems embedded in a final
HORT 005 F Basic Landscape Plants I	Pending - possible deletion	Pending
HORT 006 F Basic Landscape Plants II	Pending - possible deletion	Pending
HORT 008AF Landscape Pruning Techniques	Upon successful completion of HORT 008AF, Landscape Pruning Techniques, the student will be able to identify those plant structures important to pruning for structural as well as flower- and fruit-production pruning.	Common questions or problems embedded in a final
	Upon successful completion of HORT 008AF, Landscape Pruning Techniques, the student will be able to describe the correct pruning methods for various fruit trees, roses, flowering vines, shrubs and trees.	Common questions or problems embedded in a final
	Upon successful completion of HORT 008AF, Landscape Pruning Techniques, the student will be able to explain and demonstrate the various types of pruning cuts required for safe and effective pruning.	Skills demonstration or performance assessed against a department standard
HORT 008BF Basic Turf Care	Upon successful completion of HORT 008BF, Basic Turf Care, the student will be able to identify and explain the differences between cool and warm season grasses.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 008BF, Basic Turf Care, the student will be able to explain the roles of nitrogen, phosphorus and potassium in turf nutrition.	Common questions or problems embedded in a final

	Upon successful completion of HORT 008BF, Basic Turf Care, the student will be able to describe the operations in turf renovation and the benefits of each of these operations.	Common questions or problems embedded in a final
	Upon successful completion of HORT 008BF, Basic Turf Care, the student will be able to prescribe herbicide types for turf weed prevention and treatment.	Common questions or problems embedded in a final
HORT 008CF Home Pest Control	Upon successful completion of HORT 008CF, Home Pest Control, the student will be able to identify the characteristics of nine common insect orders found in the home landscape.	Common questions or problems embedded in a final
	Upon successful completion of HORT 008CF, Home Pest Control, the student will be able to explain (with examples) the roles of beneficial insects in controlling pests in the home landscape.	Common questions or problems embedded in a final
	Upon successful completion of HORT 008CF, Home Pest Control, the student will be able to explain the concept of the 'disease triangle' and its application to home pest control.	Common questions or problems embedded in a final
	Upon successful completion of HORT 008CF, Home Pest Control, the student will be able to explain the components of an integrated pest control program and their usage in the home landscape.	Common questions or problems embedded in a final
HORT 010AF Landscape Lighting	Upon successful completion of HORT 010AF, Landscape Lighting, the student will be able to select appropriate lighting fixtures along with a correctly rated transformer and properly sized wiring for an outdoor lighting system.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 010AF, Landscape Lighting, the student will be able to explain and differentiate the various lighting effects possible with outdoor lighting fixtures.	Common questions or problems embedded in a final

	Upon successful completion of HORT 010AF, Landscape Lighting, the student will be able to generate an outdoor lighting plan with standard lighting symbology and notations.	Project assessed against a department standard
HORT 010BF Landscape Water Features	Upon successful completion of HORT 010BF, Landscape Water Features, the student will be able to describe different types of water features and their usage.	Common questions or problems embedded in a final
	Upon successful completion of HORT 010BF, Landscape Water Features, the student will be able to select the appropriate style and scale water feature for different landscape situations.	Common questions or problems embedded in a final Project assessed against a department standard
	Upon successful completion of HORT 010BF, Landscape Water Features, the student will be able to explain the different utility connections required for water features, and their building inspection requirements.	Common questions or problems embedded in a final
HORT 045 F Pest Control Cert & Safety	Upon successful completion of HORT 045 F, Pest Control Cert and Safety, the student will be able to know the pesticide laws and regulations pretaining to pesticide use in California	Common questions or problems embedded in a final
	Upon successful completion of HORT 045 F, Pest Control Cert and Safety, the student will be able to interpret a pesticide label	Common questions or problems embedded in a final
	Upon successful completion of HORT 045 F, Pest Control Cert and Safety, the student will be able to perform mathmatical calculations regarding the proper and safe mixing and application of pesticides	Common questions or problems embedded in a final
	Upon successful completion of HORT 045 F, Pest Control Cert and Safety, the student will be able to explain the basic life cycles of insects and disease affecting plants	Common questions or problems embedded in a final

HORT 046 F Pest Safety for Landscape Work	Upon successful completion of HORT 046 F, Pest Safety for Landscape Work, the student will be able to locate and interpret the important information on a pesticide label	Common questions or problems embedded in a final
	Upon successful completion of HORT 046 F, Pest Safety for Landscape Work, the student will be able to calibrate and operate pesticide application equipment	Common questions or problems embedded in a final
	Upon successful completion of HORT 046 F, Pest Safety for Landscape Work, the student will be able to discuss routes of exposure and the importance of personal protective equipment	Common questions or problems embedded in a final
	Upon successful completion of HORT 046 F, Pest Safety for Landscape Work, the student will be able to match plant symptoms to the causal agent	Common questions or problems embedded in a final
HORT 058 F Irrigation Controller Program	Upon successful completion of HORT 058 F, Irrigation Controller Program, the student will be able to explain the basic features of an irrigation program.	Common questions or problems embedded in a final
	Upon successful completion of HORT 058 F, Irrigation Controller Program, the student will be able to poll an irrigation controller and explain its settings.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 058 F, Irrigation Controller Program, the student will be able to explain the relationships between a central control unit and a satellite controller in a central control irrigation system.	Common questions or problems embedded in a final
HORT 070 F Volunteer Naturalist Training	Upon successful completion of HORT 070 F, Volunteer Naturalist Training, the student will be able to identify and describe the plant communities of Orange County.	Common questions or problems embedded in a final

	Upon successful completion of HORT 070 F, Volunteer Naturalist Training, the student will be able to identify and explain the roles of common birds, reptiles and arthropods of Orange County.	Common questions or problems embedded in a final
	Upon successful completion of HORT 070 F, Volunteer Naturalist Training, the student will be able to explain the relationships between biotic and abiotic features of ecosystems found in Orange County.	Common questions or problems embedded in a final
HORT 075 F Habitat Assessment & Restor.	Upon successful completion of HORT 075 F, Habitat Assessment and Restoration, the student will be able to explain man's impact on local ecosystems.	Common questions or problems embedded in a final
	Upon successful completion of HORT 075 F, Habitat Assessment and Restoration, the student will be able to explain techniques required to restore degraded habitats.	Common questions or problems embedded in a final
	Upon successful completion of HORT 075 F, Habitat Assessment and Restoration, the student will be able to assess the condition of an existing habitat, and determine the historical ecosystem for the site.	Project assessed against a department standard
	Upon successful completion of HORT 075 F, Habitat Assessment and Restoration, the student will be able to identify threatened plants and animals of Orange County.	Common questions or problems embedded in a final
HORT 152 F Applied Botany	Upon successful completion of HORT 152 F, Applied Botany, the student will be able to explain the functions of the different tissues found in leaves, stems, roots and flowers.	Common questions or problems embedded in a final

	Upon successful completion of HORT 152 F, Applied Botany, the student will be able to explain the functions of DNA and RNA and their effects on inheritance and cell functions.	Common questions or problems embedded in a final
	Upon successful completion of HORT 152 F, Applied Botany, the student will be able to explain the different processes involved in different types of photosynthesis and respiration.	Common questions or problems embedded in a final
	Upon successful completion of HORT 152 F, Applied Botany, the student will be able to explain the functions of five plant growth regulators on plant growth and cell functions.	Common questions or problems embedded in a final
HORT 153 F Landscape Irrigation	Upon successful completion of HORT 153 F, Landscape Irrigation, the student will be able to select components for, and explain the proper installation of valve manifolds, swing joints, sprinkler heads and irrigation controllers for a modern irrigation system.	Common questions or problems embedded in a final Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 153 F, Landscape Irrigation, the student will be able to select and explain the proper installation for atmospheric vacuum breakers, pressure vacuum breakers and reduced pressure backflow preventers.	Common questions or problems embedded in a final
	Upon successful completion of HORT 153 F, Landscape Irrigation, the student will be able to organize and develop a complete materials list for a small irrigation system which includes pipe, fittings, sprinkler heads, backflow preventers, automatic control valves and an irrigation controller.	Project assessed against a department standard
	Upon successful completion of HORT 153 F, Landscape Irrigation, the student will be able to explain how to calculate the amount of accumulated friction loss between the beginning and the end of an irrigation lateral line.	Common questions or problems embedded in a final

HORT 154 F Irrigation Design	Upon successful completion of HORT 154 F, Irrigation Design, the student will be able to evaluate (measure and calculate) the amount of available pressure and available flow at a site.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 154 F, Irrigation Design, the student will be able to select appropriate sprinkler heads for a landscape site based upon available pressure, available flow and other site conditions.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 154 F, Irrigation Design, the student will be able to correctly 'size' irrigation main lines and lateral lines for use in an irrigation system.	Common questions or problems embedded in a final Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 154 F, Irrigation Design, the student will be able to specify an irrigation controller appropriate for the size and complexity of the irrigation system.	Common questions or problems embedded in a final
HORT 155 F Soils	Upon successful completion of HORT 155 F, Soils, the student will be able to distinguish the properties of soils dominated by sand, silt and clay, respectively.	Common questions or problems embedded in a final
	Upon successful completion of HORT 155 F, Soils, the student will be able to define and explain the significance of soil pH.	Common questions or problems embedded in a final
	Upon successful completion of HORT 155 F, Soils, the student will be able to explain the components of water potential and their significance on plant growth.	Common questions or problems embedded in a final
	Upon successful completion of HORT 155 F, Soils, the student will be able to explain the various processes of soil formation and their significance on Orange County soils.	Common questions or problems embedded in a final

HORT 156 F Plant Nutrition	Upon successful completion of HORT 156 F, Plant Nutrition, the student will be able to identify primary nutrients, macro-nutrients and micro-nutrients required for plant growth.	Common questions or problems embedded in a final
	Upon successful completion of HORT 156 F, Plant Nutrition, the student will be able to identify deficiency symptoms associated with nitrogen, phosphorus, potassium, iron, zinc and manganese.	Common questions or problems embedded in a final Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 156 F, Plant Nutrition, the student will be able to perform simple reagent-based tests to determine nutrient concentrations in soil and plant tissues.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 156 F, Plant Nutrition, the student will be able to calculate, mix and dilute a concentrated fertilizer blend for application in a fertilizer injector.	Common questions or problems embedded in a final Skills demonstration or performance assessed against a department standard
HORT 157 F Irrigation Principles	Upon successful completion of HORT 157 F, Irrigation Principles, the student will be able to demonstrate the proper techniques for auditing an existing irrigation system to evaluate its precipitation rate and distribution uniformity.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 157 F, Irrigation Principles, the student will be able to calculate an appropriate irrigation schedule when provided with soil, plant and sprinkler and irrigation controller information.	Common questions or problems embedded in a final
	Upon successful completion of HORT 157 F, Irrigation Principles, the student will be able to evaluate, troubleshoot, repair and adjust an existing irrigation system for optimal performance and efficiency.	Common questions or problems embedded in a final Skills demonstration or performance assessed against a department standard

HORT 160 F Plant ID / Ornamental Trees	Upon successful completion of HORT 160 F, Plant Identification (Ornamental Trees), the student will be able to identify, by common and botanical name, evergreen, deciduous, coniferous and palm-related trees covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 160 F, Plant Identification (Ornamental Trees),, the student will be able to explain the appropriate landscape usage of evergreen, deciduous, coniferous and palm-related trees covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 160 F, Plant Identification (Ornamental Trees), the student will be able to select appropriate evergreen, deciduous, coniferous and palm-related trees for different landscape styles utilized in southern California landscapes.	Common questions or problems embedded in a final
HORT 161 F Plant ID/Ornamental Shrubs	Upon successful completion of HORT 161 F, Plant Identification (Ornamental Shrubs), the student will be able to by common and botanical name, evergreen, deciduous, coniferous and monocot shrubs, vines and groundcovers covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 161 F, Plant Identification (Ornamental Shrubs), the student will be able to explain the appropriate landscape usage of evergreen, deciduous, coniferous and monocot shrubs, vines and groundcovers covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 161 F, Plant Identification (Ornamental Shrubs), the student will be able to select appropriate evergreen, deciduous, coniferous and monocot shrubs, vines and groundcovers for different landscape styles utilized in southern California landscapes.	Common questions or problems embedded in a final

HORT 162 F Landscaping for Dry Climates	Upon successful completion of HORT 162 F, Landscaping for Dry Climates, the student will be able to identify, by common and botanical name, drought-tolerant trees, shrubs, vines, herbaceous perennials and succulent plants covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 162 F, Landscaping for Dry Climates, the student will be able to explain the appropriate landscape usage of drought-tolerant trees, shrubs, vines, herbaceous perennials and succulent plants covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 162 F, Landscaping for Dry Climates, the student will be able to select appropriate drought-tolerant trees, shrubs, vines, herbaceous perennials and succulent plants for different landscape styles utilized in southern California landscapes.	Project assessed against a department standard
HORT 164 F Plant Id / Anls-Perenls_House	Upon successful completion of HORT 164 F, Plant Identification (Annual, Perennials, and Houseplants), the student will be able to identify, by common and botanical name, annuals, perennials, houseplants, ferns and bulb plants covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 164 F, Plant Identification (Annual, Perennials, and Houseplants), the student will be able to explain the appropriate landscape usage of annuals, perennials, houseplants, ferns and bulb plants covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 164 F, Plant Identification (Annual, Perennials, and Houseplants), the student will be able to select appropriate annuals, perennials, houseplants, ferns and bulb plants for different landscape styles utilized in southern California landscapes.	Common questions or problems embedded in a final

HORT 165 F Landscape Management	Upon successful completion of HORT 165 F, Landscape Management, the student will be able to calculate the correct application of fertilizer for turf areas, planter areas, existing trees and existing shrubs in a landscape	Common questions or problems embedded in a final
	Upon successful completion of HORT 165 F, Landscape Management, the student will be able to identify and classify 20 weeds covered in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 165 F, Landscape Management, the student will be able to demonstrate the safe and effective use of commonly used herbicides and insecticides commonly used in southern California landscapes.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 165 F, Landscape Management, the student will be able to explain the proper steps employed in renovating turf in southern California.	Common questions or problems embedded in a final
	Upon successful completion of HORT 168 F, Landscape Construction, the student will be able to identify and explain the duties of the landscape contractor, landscape designer, landscape architect and homeowner in regard to a landscape project.	Common questions or problems
HORT 168 F Landscape Construction	Upon successful completion of HORT 168 F, Landscape Construction, the student will be able to measure and build a take-off list from a scaled landscape plan.	Common questions or problems
HORT 169LF Landscape Construction Lab	Upon successful completion of HORT 169LF, Landscape Construction Lab, the student will be able to demonstrate the safe and effective use of concrete mixing and finishing tools.	Skills demonstration or performance assessed against a department standard

	Upon successful completion of HORT 169LF, Landscape Construction Lab, the student will be able to demonstrate the safe and effective use of wood carpentry tools such as skill saws, chop saws, electric or battery powered drills, hand squares, hand saws and various marking and measuring tools.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 169LF, Landscape Construction Lab, the student will be able to demonstrate the accurate and efficient use of site measuring tools such as a builder's level, laser level, measuring wheel and steel tape measure.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 169LF, Landscape Construction Lab, the student will be able to demonstrate the safe and effective use of demolition and cutting tools such as a jackhammer, demolition hammer, hammer drill, brick saw and skid-steer loader.	Skills demonstration or performance assessed against a department standard
HORT 170 F Landscaping Contracting	Upon successful completion of HORT 170 F, Landscaping Contracting, the student will be able to explain the requirements necessary to obtain a California C-27 landscape contractor's license.	Common questions or problems embedded in a final
	Upon successful completion of HORT 170 F, Landscaping Contracting,, the student will be able to compare the difference between landscape jobs that do and do not require a landscape contractor's license.	Common questions or problems embedded in a final
	Upon successful completion of HORT 170 F, Landscaping Contracting, the student will be able to explain the mechanic's lien law and its application to landscape contractors.	Common questions or problems embedded in a final

	Upon successful completion of HORT 170 F, Landscaping Contracting, the student will be able to explain the benefits of a landscape contractor's license as compared to that of an electrical contractor, a masonry contractor, a plumbing contractor, etc.	Common questions or problems embedded in a final
HORT 173 F Greenhouse & Nursery Productn	Upon successful completion of HORT 170 F, Landscaping Contracting,	Common questions or problems embedded in a final
	Upon successful completion of HORT 173 F, Greenhouse and Nursery Production, the student will be able to select heating, ventilation and cooling equipment to meet the needs of a greenhouse in different locations throughout the state.	Project assessed against a department standard
	Upon successful completion of HORT 173 F, Greenhouse and Nursery Production, the student will be able to evaluate and explain the interrelationship of soil, fertilization and irrigation systems on container plant production.	Common questions or problems embedded in a final
	Upon successful completion of HORT 173 F, Greenhouse and Nursery Production, the student will be able to identify and explain different centralized climate control systems used in modern greenhouses.	Common questions or problems embedded in a final
HORT 174 F Plant Propagation	Upon successful completion of HORT 174 F, Plant Propagation, the student will be able to explain the difference between sexual and asexual propagation and the advantages of each.	Common questions or problems embedded in a final
	Upon successful completion of HORT 174 F, Plant Propagation, the student will be able to demonstrate techniques for propagating ferns from spores using commonly available equipment and materials.	Skills demonstration or performance assessed against a department standard

	Upon successful completion of HORT 174 F, Plant Propagation, the student will be able to explain the difference between the four types of stem cuttings and examples plants that should be propagated with each type of cutting.	Common questions or problems embedded in a final
	Upon successful completion of HORT 174 F, Plant Propagation, the student will be able to explain the difference between stratification and scarification and give examples of each type of technique.	Common questions or problems embedded in a final
HORT 177 F Turf Grass Management	Upon successful completion of HORT 177 F, Turf Grass Management, the student will be able to correctly identify by common name, 15 turfgrass species taught in the class.	Common questions or problems embedded in a final
	Upon successful completion of HORT 177 F, Turf Grass Management, the student will be able to demonstrate the safe and efficient use of de-thatching and aerifying machines used in turf maintenance.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 177 F, Turf Grass Management, the student will be able to distinguish between cool season and warm season turfgrass species.	Common questions or problems embedded in a final
	Upon successful completion of HORT 177 F, Turf Grass Management, the student will be able to identify by common name, 15 weed species commonly found in turf.	Common questions or problems embedded in a final
	Upon successful completion of HORT 177 F, Turf Grass Management, the student will be able to prepare a landscape area for a new seed or sod lawn.	Skills demonstration or performance assessed against a department standard
HORT 185 F Arboriculture	Upon successful completion of HORT 185 F, Arboriculture, the student will be able to explain the difference between heading, thinning, drop-crotch and topping cuts made on a tree.	Common questions or problems embedded in a final

	Upon successful completion of HORT 185 F, Arboriculture, the student will be able to demonstrate the safe and effective used of the climbing harness and climbing ropes used in arboriculture.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 185 F, Arboriculture, the student will be able to demonstrate safe and effective use of a chain saw during the pruning of a tree.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 185 F, Arboriculture, the student will be able to explain the different techniques used in staking trees for stability and strength.	Common questions or problems embedded in a final
HORT 188 F Intergrated Pest Management	Upon successful completion of HORT 188 F, Integrated Pest Management, the student will be able to list and describe the concept of an integrated pest management program	Common questions or problems embedded in a final
	Upon successful completion of HORT 188 F, Integrated Pest Management the student will be able to analyze and design an IPM program for a specific crop	Project assessed against a department standard
	Upon successful completion of HORT 188 F, Integrated Pest Management the student will be able to distinguish between beneficial and pest insects	Common questions or problems embedded in a final
	Upon successful completion of HORT 188 F, Integrated Pest Management the student will be able to assess how climate and plant care relate to biotic and abiotic plant disorders	Common questions or problems embedded in a final
HORT 200 F Landscape Design	Upon successful completion of HORT 200 F, Landscape Design, the student will be able to develop a site inventory and analysis for an existing landscape situation.	Skills demonstration or performance assessed against a department standard

	Upon successful completion of HORT 200 F, Landscape Design, the student will be able to explain the different types of construction documentation developed by a landscape designer.	Common questions or problems embedded in a final
	Upon successful completion of HORT 200 F, Landscape Design, the student will be able to explain the differences between a landscape designer and a landscape architect.	Common questions or problems embedded in a final
	Upon successful completion of HORT 200 F, Landscape Design, the student will be able to develop a design program based upon the needs of the client and the opportunities and constraints of the landscape itself.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 200 F, Landscape Design, the student will be able to define and draw a functional plan which meets the needs of the design program developed above.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 200 F, Landscape Design, the student will be able to produce several design schemes which utilize the functional plan developed above.	Skills demonstration or performance assessed against a department standard
HORT 201 F Adv Landscape Design	Upon successful completion of HORT 201 F, Advanced Landscape Design, the student will be able to create an elevation and/or section plan from an existing plan view landscape design.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 201 F, Advanced Landscape Design,1 the student will be able to create a perspective view of a landscape plan for use in a project presentation.	Skills demonstration or performance assessed against a department standard

	Upon successful completion of HORT 201 F, Advanced Landscape Design, the student will be able to select plant materials for a landscape designs based on landscape styles including Mediterranean, Oriental, tropical, sub-tropical, temperate and desert.	Skills demonstration or performance assessed against a department standard
HORT 205 F Applied Entomology	Upon successful completion of HORT 205 F, Applied Entomology, the student will be able to identify insects to the proper taxonomic order in personal insect collection	Common questions or problems embedded in a final Project assessed against a department standard
	Upon successful completion of HORT 205 F, Applied Entomology the student will be able to know the mouthpart type and life cycles of various insect pests	Common questions or problems embedded in a final
	Upon successful completion of HORT 205 F, Applied Entomology the student will be able to explain the various methods of controlling pests	Common questions or problems embedded in a final
	Upon successful completion of HORT 205 F, Applied Entomology the student will be able to analyze how insect structure and physiology relate to the various control measures	Common questions or problems embedded in a final
HORT 207 F Plant Pathology	Upon successful completion of HORT 207 F, Plant Pathology, the student will be able to describe the causal agents of plant disease	Common questions or problems embedded in a final
	Upon successful completion of HORT 207 F, Plant Pathology, the student will be able to relate plant symptoms to biotic and abiotic plant diseases	Common questions or problems embedded in a final
	Upon successful completion of HORT 207 F, Plant Pathology, the student will be able to illustrate the proper laboratory techniques for isolating plant pathogens	Project assessed against a department standard

	Upon successful completion of HORT 207 F, Plant Pathology, the student will be able to collect and analyze data based on standard scientific methodology	Project assessed against a department standard
HORT 215 F Diseases/Pests Ornament Plants	Upon successful completion of HORT 215 F, Diseases and Pests of Ornamental Plants, the student will be able to relate plant damage to insect type or disease agent	Common questions or problems embedded in a final
	Upon successful completion of HORT 215 F, Diseases and Pests of Ornamental Plants, the student will be able to know the pest control methods used to control or suppress pests or disease on ornamental plants	Common questions or problems embedded in a final
	Upon successful completion of HORT 215 F, Diseases and Pests of Ornamental Plants, the student will be able to demonstrate an understanding of pesticide laws and regulations pretaining to their use on ornamental plants	Common questions or problems embedded in a final
HORT 218 F Landscape Hydraulics	Upon successful completion of HORT 218 F, Landscape Hydraulics, the student will be able to calculate static and dynamic pressures in an irrigation system.	Common questions or problems embedded in a final
	Upon successful completion of HORT 218 F, Landscape Hydraulics, the student will be able to calculate friction losses in an irrigation system.	Common questions or problems embedded in a final
	Upon successful completion of HORT 218 F, Landscape Hydraulics, the student will be able to specify a booster pump motor and impellor size to meet known flow and pressure demands.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 218 F, Landscape Hydraulics, the student will be able to size and specify components for a complete drip irrigation system.	Skills demonstration or performance assessed against a department standard

HORT 219 F CAD Appl in Horticulture	Upon successful completion of HORT 219 F, CAD Applications in Horticulture, the student will be able to create a set of AIA compliant layers for use in a landscape CAD drawing.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 219 F, CAD Applications in Horticulture, the student will be able to create a base plan, including house footprint, utility line locations, property lines, permanent hardscape features and permanent plant features from a series of site measurements.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 219 F, CAD Applications in Horticulture, the student will be able to organize drawing projects into appropriate files and folders.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 219 F, CAD Applications in Horticulture, the student will be able to build and use a template drawing to improve efficiency and consistency.	Speech or presentation assessed against a department standard
	Upon successful completion of HORT 219 F, CAD Applications in Horticulture, the student will be able to produce landscape drawing which meet professional standards of accuracy, graphical clarity, legibility and style.	Speech or presentation assessed against a department standard
HORT 920 F Adv CAD Appl in Horticulture	Upon successful completion of HORT 920 F, Advanced CAD Applications in Horticulture, the student will be able to utilize an external reference drawing in the production of a landscape plan.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 920 F, Advanced CAD Applications in Horticulture, the student will be able to produce construction detail drawings and insert them into a detail sheet at the appropriate scale and location.	Speech or presentation assessed against a department standard

	Upon successful completion of HORT 920 F, Advanced CAD Applications in Horticulture, the student will be able to export a CAD drawing into PDF and JPG formats for use in other computer programs.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 920 F, Advanced CAD Applications in Horticulture, the student will be able to produce a colored presentation drawing from a black and white CAD file.	Skills demonstration or performance assessed against a department standard Speech or presentation assessed against a department standard
	Upon successful completion of HORT 920 F, Advanced CAD Applications in Horticulture, the student will be able to create 3D planting symbols for use in a 3D rendered landscape plan.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 920 F, Advanced CAD Applications in Horticulture, the student will be able to export a rendered 3D CAD drawing into a raster-based program for editing and touch-up.	Skills demonstration or performance assessed against a department standard
	Upon successful completion of HORT 920 F, Advanced CAD Applications in Horticulture, the student will be able to create a simple walk-through animation to illustrate a 3D landscape plan.	Skills demonstration or performance assessed against a department standard

Course	Student Learning Outcomes	Method(s) of Assessment
PHYSICAL SCIENCES	**All PHSC courses are being deleted.**	
PHSC 050 F Success in Science	Pending Deletion F13	
PHSC 051 F Success in Physical Science	Pending Deletion F13	
PHSC 102 F Physical Science Survey	Pending Deletion F13	

PHSC 103AF Physical Sciences for Teachers: Physics Pending Deletion F13	Pending Deletion F13 Upon successful completion of PHSC 103 A F, the student will be able to predict the outcome of various physical scenarios by applying the appropriate laws and principles of physics.	Common questions or problems embedded in a final Project assessed against a department standard Students demonstrate their ability to determine qualitative outcomes of physical scenarios by completing homework assignments, group projects in class, and exams.
	Pending Deletion F13 Upon successful completion of PHSC 103 A F, the student will be able to design a scientific experiment to verify the laws of physics and explain the results in terms of the appropriate laws and principles of physics.	Project assessed against a department standard Students demonstrate their ability to design scientific experiments that verify the laws of physics by performing group experiments under instructor supervision. They demonstrate their ability to explain the results in a written report for each laboratory session.
	Pending Deletion F13 Upon successful completion of PHSC 103 A F, the student will be able to produce, interpret, and predict graphs showing the relationship between two physical quantities.	Common questions or problems embedded in a final Students demonstrate their ability to produce, interpret, and predict graphs by graphically analyzing data obtained in laboratory activities, explaining such analysis in a written lab report, and correctly answering related questions on homework assignments and examinations.
PHSC 103BF Physical Sciences for Teachers: Chemistry	Pending Deletion F13	Pending
PHSC 299 F Physical Sciences Indep Study	Pending Deletion F13	Pending
PHYSICS		
PHYS 130 F Elementary Physics	Upon successful completion of PHYS 130 F, Elementary Physics, the student will be able to determine qualitative outcomes of various physical scenarios by applying deductive reasoning with the appropriate laws and principles of physics.	Common questions or problems embedded in a final Project assessed against a department standard Students demonstrate their ability to determine qualitative outcomes of various physical scenarios in regularly scheduled conceptual homework assignments, group projects in class, and conceptual examinations.

	Upon successful completion of PHYS 130 F, Elementary Physics, the student will be able to investigate various physical scenarios experimentally and explain the results in terms of the appropriate laws and principles of physics.	Project assessed against a department standard Students demonstrate their ability to investigate various physical scenarios experimentally by performing physical experiments using accepted scientific principles under instructor supervision. They demonstrate their ability to explain the results in a written report for each laboratory session.
	Upon successful completion of PHYS 130 F, Elementary Physics, the student will be able to produce, interpret, and predict graphs showing the relationship between two physical quantities.	Common questions or problems embedded in a final Project assessed against a department standard Students demonstrate their ability to produce, interpret, and predict graphs by graphically analyzing data obtained in laboratory activities, explaining such analysis in a written lab report, and correctly answering related questions on homework assignments and examinations.
PHYS 205 F Physics for the Life Sciences I	Upon successful completion of PHYS 205 F, Physics for the Life Sciences I, the student will be able to compare mechanical models to real-world systems in the laboratory, test theory via experiments, and recognize and analyze deviations from idealized theoretical behavior.	Project assessed against a department standard Laboratory experiments.
	Upon successful completion of PHYS 205 F, Physics for the Life Sciences I, the student will be able to analyze physical situations using conservation of mass, energy, momentum, and angular momentum.	Common questions or problems embedded in a final Homework and exams.

	Upon successful completion of PHYS 205 F, Physics for the Life Sciences I, the student will be able to determine the applicability and nonapplicability of equations in particular situations in mechanics, describe the approximations and limitations involved, and systematically evaluate the usefulness of various equations by making lists of known and unkown quantities.	Common questions or problems embedded in a final Homework and exams.
PHYS 206 F Physics for the Life Sciences II	Upon successful completion of PHYS 206 F, Physics for the Life Sciences II, the student will be able to compare theoretical physical models of electricity, optics, and modern physics to real-world systems in the laboratory, test theory via experiments, and recognize and analyze deviations from idealized theoretical behavior.	Project assessed against a department standard Laboratory experiments.
	Upon successful completion of PHYS 206 F, Physics for the Life Sciences II, the student will be able to analyze electrical circuits using voltage and current.	Common questions or problems embedded in a final Homework and exams.
	Upon successful completion of PHYS 206 F, Physics for the Life Sciences II, the student will be able to determine the applicability and nonapplicability of equations in particular situations involving electricity, optics, and modern physics, describe the approximations and limitations involved, and systematically evaluate the usefulness of various equations by making lists of known and unkown quantities.	Common questions or problems embedded in a final Homework and exams.

PHYS 210 F Physics with Calculus for the Life Sciences I	Upon successful completion of PHYS 210 F, Physics with Calculus for the Life Sciences I, the student will be able to compare mechanical models to real-world systems in the laboratory, test theory via experiments, and recognize and analyze deviations from idealized theoretical behavior.	Project assessed against a department standard Laboratory experiments.
	Upon successful completion of PHYS 210 F, Physics with Calculus for the Life Sciences I, the student will be able to analyze physical situations using conservation of mass, energy, momentum, and angular momentum.	Common questions or problems embedded in a final Homework and exams.
	Upon successful completion of PHYS 210 F, Physics with Calculus for the Life Sciences I, the student will be able to determine the applicability and nonapplicability of equations in particular situations in mechanics, describe the approximations and limitations involved, and systematically evaluate the usefulness of various equations by making lists of known and unkown quantities.	Common questions or problems embedded in a final Homework and exams.
PHYS 211 F Physics with Calculus for the Life Sciences II	Upon successful completion of PHYS 211 F, Physics with Calculus for the Life Sciences II, the student will be able to compare theoretical physical models of electricity, optics, and modern physics to real-world systems in the laboratory, test theory via experiments, and recognize and analyze deviations from idealized theoretical behavior.	Project assessed against a department standard Laboratory experiments.
	Upon successful completion of PHYS 211 F, Physics with Calculus for the Life Sciences II, the student will be able to analyze electrical circuits using voltage and current.	Common questions or problems embedded in a final Homework and exams.

	Upon successful completion of PHYS 211 F, Physics with Calculus for the Life Sciences II, the student will be able to determine the applicability and nonapplicability of equations in particular situations involving electricity, optics, and modern physics, describe the approximations and limitations involved, and systematically evaluate the usefulness of various equations by making lists of known and unkown quantities.	Common questions or problems embedded in a final Homework and exams.
PHYS 221 F General Physics I	Upon successful completion of Physics 221 F, General Physics I, the student will be able to determine qualitative outcomes of various mechanics scenarios by applying deductive reasoning with the appropriate laws and principles of physics.	Common questions or problems embedded in a final Project assessed against a department standard Students demonstrate their ability to determine qualitative outcomes of various mechanics scenarios in regularly scheduled conceptual homework assignments, group projects in class, and conceptual examinations for each major topic throughout the course and in a cumulative final examination at the end of the semester.
	Upon successful completion of Physics 221 F, General Physics I, the student will be able to determine quantitative outcomes of various mechanics scenarios by applying algebra, trigonometry, geometry, and calculus with the appropriate laws and principles of physics.	Common questions or problems embedded in a final Students demonstrate their ability to determine quantitative outcomes of various mechanics scenarios in regularly scheduled analytic homework assignments and analytical examinations for each major topic throughout the course.
	Upon successful completion of Physics 221 F, General Physics I,, the student will be able to investigate various mechanics scenarios experimentally and explain the results in terms of the appropriate laws and principles of physics.	Project assessed against a department standard Students demonstrate their ability to investigate various mechanics scenarios experimentally by doing so in the laboratory under instructor supervision in regularly scheduled laboratory sessions throughout the course. They demonstrate their ability to explain the results in a written report for each laboratory session.

PHYS 222 F General Physics II	Upon successful completion of Physics 222 F, General Physics II, the student will be able to determine qualitative outcomes of various electromagnetic scenarios by applying deductive reasoning with the appropriate laws and principles of physics.	Common questions or problems embedded in a final Project assessed against a department standard Students demonstrate their ability to determine qualitative outcomes of various electromagnetic scenarios in regularly scheduled conceptual homework assignments, group projects in class, and conceptual examinations for each major topic throughout the course and in a cumulative final examination at the end of the semester.
	Upon successful completion of Physics 222 F, General Physics II, the student will be able to determine quantitative outcomes of various electromagnetic scenarios by applying algebra, trigonometry, geometry, and calculus with the appropriate laws and principles of physics.	Common questions or problems embedded in a final Students demonstrate their ability to determine quantitative outcomes of various electromagnetic scenarios in regularly scheduled analytic homework assignments and analytical examinations for each major topic throughout the course.
	Upon successful completion of Physics 222 F, General Physics II, the student will be able to investigate various electromagnetic scenarios experimentally and explain the results in terms of the appropriate laws and principles of physics.	Project assessed against a department standard Students demonstrate their ability to investigate various electromagnetic scenarios experimentally by doing so in the laboratory under instructor supervision in regularly scheduled laboratory sessions throughout the course. They demonstrate their ability to explain the results in a written report for each laboratory session.
PHYS 223 F General Physics III	Upon successful completion of Physics 223 F,General Physics III, the student will be able to determine qualitative outcomes of various physics scenarios by applying deductive reasoning with the appropriate laws and principles of physics.	Common questions or problems embedded in a final Project assessed against a department standard Students demonstrate their ability to determine qualitative outcomes of various physics scenarios in regularly scheduled conceptual homework assignments, group projects in class, and conceptual examinations for each major topic throughout the course and in a cumulative final examination at the end of the semester.

	Upon successful completion of Physics 223 F,General Physics III, the student will be able to determine quantitative outcomes of various physics scenarios by applying algebra, trigonometry, geometry, and calculus with the appropriate laws and principles of physics.	Common questions or problems embedded in a final Students demonstrate their ability to determine quantitative outcomes of various physics scenarios in regularly scheduled analytic homework
	Upon successful completion of Physics 223 F,General Physics III, the student will be able to investigate various physics scenarios experimentally and explain the results in terms of the appropriate laws and principles of physics.	Project assessed against a department standard Students demonstrate their ability to investigate various physics scenarios experimentally by doing so in the laboratory under instructor supervision in regularly scheduled laboratory sessions throughout the course. They demonstrate their ability to explain the results in a written report for each laboratory session.