

BIOLOGY DEPARTMENT
COURSE DESCRIPTIONS
FALL 2018
1191

<u>Biology 105</u>	Technology Inspired by Nature	(3 credits)	Althoff
	MW 2:15-3:35	105 LSC	

Description: Explore how the biological world may provide solutions for many of the technological problems faced by society. We will examine the ways that organisms function and interact, and apply this knowledge towards understanding and creating technological advances. The course will be loosely organized around topics such as flight, communication and networking, swarm intelligence, computing, agriculture, chemical engineering, energy production, and medicine. Students will develop an appreciation of biology, how it is studied, and its importance to human society. This is a lecture course.

Textbook: none
Class size: 100

Prerequisites: none
Frequency of Offering: Every other Fall semester

<u>Biology 121</u>	General Biology I	(4 credits)	Wiles
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Lecture - Monday **AND** Wednesday 10:35-11:30 AM **OR** 12:45-1:40 PM Giff Aud
Lab - One 3-hour section per week (simultaneous lab and discussion)

Description: Required entry-level course for biology majors and the first of a two-course sequence comprising a survey of essential biological concepts ranging from the molecular level to global ecology. Two lectures and 1 combined lab/recitation section per week. Students in Biology 121 will explore the nature of science and the diversity of organisms within a framework of major themes including the flow and regulation of energy and information within living systems, and the central and unifying concept of evolution. Efforts will be made to relate key concepts to model organisms for research and practical examples such as diseases and environmental issues.

Required Materials:

Textbook: Campbell Biology General Biology I and II, Custom Edition for Syracuse University, available at SU bookstore only.

Exams: 4 per semester (3 on Monday evenings, 1 during final exam week) - multiple choice; essays, quizzes, papers and reports in lab/recitation groups.

Class size: 800 limit Frequency of Offering: Each fall semester

Biology 211 Introduction to Neuroscience (3 credits) Jones

MW 12:45-2:05 011 LSC

Description: This course is an introduction to the mammalian nervous system, with emphasis on the structure and function of the human brain. Students interested in the Neuroscience Integrated Learning Major should know that this course is one of two possible entry-level required courses for that major. Topics include the cell biology and function of nerve cells and associated cells such as glia, selected sensory systems, and control of movement. Discussion of brain diseases and brain pathology will be used to illustrate brain function and structure concepts. Two lectures/week will be taught using Team Based Learning and students will spend most of class time working in teams to solve case study problems as well as engage in other team learning activities that promote deeper understanding of basic neuroscience concepts.

Prerequisites: High school biology and chemistry

Class size: 45

Biology 216 Anatomy and Physiology I (4 credits) Sweet

Lecture:	001	MW	12:45-2:05	001 LSC
Labs:	002	W	8:00-10:00	308 LSC
	003	W	10:35-12:35	308 LSC
	004	T	8:00-10:00	308 LSC
	008	T	10:20-12:20	308 LSC
	010	W	3:45-5:45	308 LSC
Recitations:	005	Th	5:00-6:20	300 LSC
	006	F	12:45-2:05	300 LSC
	007	M	8:00-9:20	300 LSC
	009	Th	5:00-6:20	011 LSC
	011	F	12:45-2:05	214 LSC

Description: An introduction to the structure and function of human tissues, organs and systems. The course is designed with an emphasis on physiological functions and the role of anatomical form in these processes. Topics include skeletal & muscle structure & function; neural & integumentary systems. Exercises will include laboratory demonstrations of organ/system models, histology, interactive computer experiments and non-invasive experiments on human subjects.

Textbook: VanPutte, Regan & Russo, Seeley's Anatomy & Physiology (11th ed.)

Prerequisites: Bio 121-123 or equivalent

Grading: Weekly laboratory reports, Midterm & Final, plus weekly quizzes

Class size: 120

Frequency of Offering: Fall semesters

Biology 221 **Peer Led Team Learning** (2 credits) Snyder

001 T 11:00-11:55 126 LSC
002 Th 9:30-10:25 011 LSC

Description: A course that relates educational research literature on students and learning to classroom applications in problem solving activities. Students are prepared to be peer leaders of a small, problem-solving group of students by attending weekly one-hour meetings and participating in Blackboard and in-class discussion groups. Peer leaders are then responsible for holding a 1-hr problem solving session each week and keeping record of attendance for their group sessions.

BIO 300 Current topics in Biotechnology (3 credits) Phillips

TTh 11:00-12:20 106 LSC

Description: What is going on in biotechnology, in the real world, right now? This course is a literature-driven exploration of current topics and methodologies employed in multiple fields of biotechnology research. The particular subjects and technologies discussed will vary from semester to semester, including optogenetics, nanotechnology, immunotherapy, microbiomes, aging, neurobiology and gene editing. **This course fulfills the communications skills requirement.**

Prerequisite: Grade of C or better in BIO 121

BIO 316 Anatomy & Physiology I for Biology Majors (4 credits) Sweet

Lecture 001 MW 12:45-2:05 001 LSC
Laboratory 002 F 12:45-3:45 308 LSC
Laboratory 003 F 8:25-11:25 308 LSC

Description: Anatomy and Physiology I, for Biology and Biochemistry majors only. The course incorporates a three-credit laboratory that can be applied to the Biology major, unlike BIO 216. A combined laboratory and recitation section will meet on Fridays. Laboratory exercises include microscopy, virtual physiology experiments and other activities appropriate for a 300-level course.

Textbooks: VanPutte, Regan & Russo, Seeley's Anatomy & Physiology (11th ed.), McGraw Hill.

Rust, A Guide to Anatomy & Physiology Lab (2nd ed.), Southwest Educational Enterprises.

Prerequisites: Bio 121-123 or equivalent

Grading: Weekly quizzes and midterm and final exams. Understanding of laboratory material will be evaluated with 3 laboratory practicals. Class size: 48 Frequency of

Offering: Fall semesters

Biology 327 Cell Biology (3 credits) Erdman/Silver
TTh 11:00-12:20 Gifford Auditorium

Description: Cell structure, molecular biology of eukaryotic cells, cytoskeletal organization and function, cell division cycle, membrane structure and function, cell-cell interactions, cell differentiation and regulation.

Textbook: *Essential Cell Biology*, 4th ed., by Alberts et al. (Garland Publishing, 2013); Turning Technologies Response Card "Clicker".

Prerequisites: BIO 121, CHE 106. Class size: 350 Frequency of Offering:
Every Fall semester

Biology 345 Ecology & Evolution (3 credits) Friedman/Becklin
TTh 9:30-10:50 001 LSC

Description: A broad survey course designed to introduce the student to the topics of ecology and evolutionary biology. The material will cover evolutionary processes, natural selection and adaptation, phylogenetics, population ecology, community ecology and ecosystems. Ecology and Evolution is part of the required core curriculum of the Biology Major.

Textbooks: Online readings & activities will be assigned.

Prerequisites: 121/123 or equivalent

Class size: 239

Exams: three

Frequency of Offering: Fall semesters

Biology 355 General Physiology (3 credits) Tupper
TTh 11:00-12:20 105 LSC

Description: A lecture course on the physiology of higher animals including circulation, regulation of body fluids, nervous system, sensory systems, muscle, cardiac function and digestion.

Textbook: *Human Physiology*, Vander, Sherman & Luciano, 13th Edition, 2012.

Prerequisites: Bio 121/123; Che 106, 107

Frequency of Offering: Each semester

Class Size: 108

Biology 360 Biology Laboratory Assistant (1 credit) TAWiles

Description: Students who have completed an upper-division 3-credit hour lab may receive one credit hour for assisting in the teaching of laboratories. This opportunity is especially appropriate for students considering teaching careers. May be repeated once for credit.

M 3:45-5:05 134 LSC

Textbook: None

Prerequisites: Permission of instructor in advance.

Examinations: None

Grade: A-F based upon participation & performance

Frequency of Offering: Each semester

Biology 400/600-001 Seminar in Epigenetics of Human Health & Disease (3 credits)
MacDonald

MW 3:45-5:05 214 LSC

Description: The epigenome encodes information above and beyond the sequence of DNA, acting at the interface between genes and the environment. This course will explore how epigenetic modifications influence our health and modify our risk of disease, including neurodevelopmental and neurodegenerative disorders, heart disease, and obesity. Seminar format including lectures, discussions, student presentations, and various writing assignments.

Prereqs: BIO 326 & 327; BIO 443 or 462 recommended. Jrs. & Srs. Only.

Class size: 10

Biology 400/600-002 Sem: Isotopic Approaches in Global Change Ecology (3 credits)
Becklin

TTh 2:00-3:20 156 LSC

Description: Natural changes in atmospheric composition and climate have had major impacts on individual organisms and ecosystem functioning over geologic time. In addition to these natural changes, human activities have dramatically altered the functioning of current ecosystems, and this is only expected to increase into the future. For this course, we will discuss basic research addressing the effects of climate and atmospheric changes on both current and ancient ecosystems, with specific emphasis on studies that use stable isotope chemistry to evaluate ecological and physiological responses of biota. As part of this course, students will learn fundamental principles of isotope behavior and chemistry in natural systems, critically evaluate scientific studies that apply isotope chemistry to global change questions, and conduct authentic isotope research to learn basic methods of isotope sample preparation and data interpretation. Seminar format including lectures, discussions of current papers, student presentations, and various writing assignments.

Class size: 10

Jrs. & Srs. Only

<u>Biology 400-004,005</u>	Ecosystem Ecology Lab	(3 credits)	Frank/Fridley
-004 Lec M	12:45-1:40	306 LSC	
-005 Lab W	12:45-4:45	306 LSC	

Description: In this course students will learn to measure plant, soil, and ecosystem properties associated with global warming, the spread of invasive species, deforestation, and environmental pollution. Lab activities focus on monitoring trees and shrubs in the campus Climate Change Garden, including measurements of photosynthesis and leaf behavior, root growth, and associated animal and microbial relations. Students will also develop models of forest growth by collecting data in natural forest stands in nearby Green Lakes State Park. Students will develop an understanding of the scientific method by conducting group projects that involve data analysis and class presentations.

Prerequisite: BIO 345 Jrs. & Srs. Only

<u>Biology 400-008</u>	Biology of Marine Mammals	(3 credits)	Parks
MW	2:15-3:35	214 LSC	

Description: This course provides an introduction to the biology and conservation of cetaceans, pinnipeds, sirenians and marine otters. Topics covered in the course include taxonomy, evolution, anatomical and physiological adaptations, foraging and reproductive behavioral ecology, and major conservations concerns in marine mammals.

Prerequisite: BIO 345 Class size: 30

<u>BIO 400/600-010</u>	Microbes in Biotechnology (3 credits)	Phillips
TTh	2:00-3:20	106 LSC

Description: Microbes can do things you never imagined! They can treat disease, change your DNA, clean up human pollution, run on electricity and much, much more. This topics-driven course covers genetic, biochemical, molecular and biotechnological aspects of microbes. Readings are drawn primarily from current scientific literature devoted to the many applications of microbes (including bacteria, archaea, fungi and viruses) in multiple fields of biotechnology. **This course fulfills the communications skills requirement.**

Prerequisites: Grade of C or better in BIO 326 **AND** BIO 327

Biology 417 Animal Behavior Laboratory (3 credits) Pitnick

001 Lecture T 11:00-12:20 306 LSC
002 Lab T 12:30-4:30 306 LSC

Description: This lecture and laboratory course focuses on understanding the process of evolution by natural and sexual selection with a special emphasis on the evolution of adaptive animal behavior. Laboratory exercises provide direct experience in how to ask scientific questions, develop hypotheses, design and run experiments, analyze data, and communicate results both orally and in the form of manuscripts for peer-reviewed journals. In addition, students are required to develop and conduct an independent research project outside of class time, the results of which will be the subject of a 'term paper.' Throughout the course, we will consider how the study of evolution and animal behavior can help us understand human behavior. This course is an upper-level biology lab course appropriate for junior and senior biology majors, and will count towards the "laboratory courses" and "communication skills courses" required for biology majors.

Textbook: None

Exams: None

Coursework: Participation in group discussions and in field and laboratory group research projects, development and execution of an independent research project, writing a grant proposal and four scientific manuscripts, and two oral presentations of research plans and results from independent research project.

Prerequisites: Bio 345 or permission of instructor

Class size: 18

Biology 419 Jr/Sr Thesis Seminar (1 credit) Segraves/Erdman

T 5:00-6:00 106 LSC

Description: Seminar course with student presentations on their research projects. Open to all science students planning to write a biology-related thesis on their research project. Required of students in the Distinction in Biology and Biotechnology Programs. May be repeated for credit up to four times.

Level of Presentation: Junior-Senior. Class size: Varies Frequency of Offering:
Every semester

<u>Biology 435</u>	Genetics Laboratory	(3 credits)	Hall
001 Lec	T	2:00-3:20	208 LSC
002 Lab	Th	2:00-5:00	208 LSC

Description: Students will gain experience in genetic methods and analyses using various model organisms, such as budding yeast (*Saccharomyces cerevisiae*), fruit flies (*Drosophila melanogaster*), nematodes (*Caenorhabditis elegans*), and mustard plants (*Arabidopsis thaliana*). Experiments will include gene mapping, phenotypic analysis, transformation, complementation, population genetics, and an introduction to molecular biology.

Prerequisites: BIO 326 and 327

Textbook: None required, but a general genetics textbook would be a useful reference.

Class size: 24

<u>Biology 447</u>	Basic Immunology	(3 credits)	Fondy
TTh	2:00-3:20	105 LSC	

Description: Humoral and cell-mediated immunity. Antigens and T-cell receptor structure, function, and diversity. Cells and tissues of the immune system. Cytokines, cytokine receptors, and immune regulation. Major histocompatibility loci, tolerance, and cell-mediated cytotoxicity. Vaccines.

Textbook: *Kuby Immunology*, 7th Ed., Owen, Punt, Stranford. Freeman & Co.

Examinations: Three 1-hour exams

Prerequisites: Bio 326 and 327 Class size: 108

<u>Biology 457/657</u>	Principles of Human Toxicology	(3 credits)	J. Hewett
MWF	9:30-10:25	011 LSC	

Description: This course will examine the interactions between chemical, physical or biological substances and mammalian systems that result in adverse changes in physiological function. Concepts in chemistry, biochemistry, cell biology, and anatomy and physiology will be applied to the study of absorption, distribution, biometabolism and elimination of toxic agents, or poisons. In addition, general molecular mechanisms by which poisons act will be examined, including the processes of genotoxicity and carcinogenesis. Several general classes of poisonous agents, including pesticides, herbicides, and heavy metals, will be discussed in some detail. Finally, students will learn about important concepts in exposure risk assessment and the government agencies that regulate use of and exposure to chemicals in our food and environment. Additional work will be required of graduate students.

PREREQS: BIO 327, and CHE 275, and MAT 285

Textbook: Casarett & Doull's *Toxicology: The basic science of poisons*, 8th Edition.

Biology 459/659 Plants & People (3 credits) Coleman

TTh 12:30-1:50 011 LSC

Description: Plants are critical for sustaining life on Earth. They sequester carbon dioxide and convert solar energy to forms that can be used, acting as key agents against climate change. In addition they are a key source of food, clothing and fuel. This course will focus on how plants function individually, and as they interact with their environment. The course goals are to gain an understanding of basic plant biology at the molecular level, to understand the role of plants in the environment and in society, and to use this information to make informed opinions and decisions about current environmental issues including air pollution, land conservation, climate change and genetic modification. As plants are a model system for molecular genetics, cell biology and biochemistry research, this class is an excellent elective for students interested in these areas.

Prerequisites: Bio 121 & 123; or AP equivalent Class size: 40

Biology 460 Research in Biology (1-4 credits) Faculty

Description: Bio 460 is intended for Biology Majors who wish to participate in either a laboratory or field research project. **Bio 460 replaces independent study or experience credit courses for research purposes.** Student research projects will incorporate use of the scientific method, experimentation, data analysis, data presentation and interpretation, and the responsibilities of scientific integrity.

To enroll in Bio 460, the student must seek a sponsor who is willing to direct an appropriate project. Typically, the sponsor will assign the student to some aspect of an existing, larger research project. In consultation with the sponsor, the student will submit a petition with the Department Undergraduate Secretary which states the nature of the project, the expectations regarding time commitment (3 hrs. per week per credit hr.), and the means of evaluation.

The grading procedure for Bio 460 will generally be based on 1) the faculty member's evaluation of overall student performance, and 2) examination of required laboratory records or notebooks. Evaluation may also include 3) a report written by the student which documents the experience and results in scientific format. Students can enroll in Bio 460 more than once, but the total credit hours applied to the Biology Major requirements cannot exceed 4 hours.

Frequency of Offering: Each semester

Biology 461 Experience in Biology (0 credits) Faculty & R. Raina

Description: Internship or work experience supervised by a faculty mentor. Projects may include experimentation, data analysis, presentation, and responsibilities of scientific integrity. Development and analysis of business plans or intellectual property in **biotechnology-focused** companies, agencies or law firms is also possible. Biotechnology Majors only.

Frequency of Offering: Each semester

Biology 463/663 Molecular Biotechnology (4 credits; 3 of these count towards lab credit)
S. Raina

001 Lec	MWF	11:40-12:35	011 LSC
002 Lab	Th	12:30-3:45	206 LSC

Description: Molecular Biotechnology is the first course of a two-course Biotechnology series. The second course, Applied Biotechnology, will be offered in the spring. These courses complement each other, but one is not required for the other.

These courses will introduce students to the molecular and genetic principles and processes involved in biotechnology. Lectures will include topics such as the genetic modification of microbial, plant, & animal cells, forensic biotechnology, and important medical, industrial, agricultural and environmental applications of biotechnology. Labs will cover many of the methods routinely used in biotechnology labs.

This course will address questions such as: What is biotechnology, how is it done, and how is it being used today? How can biotechnology impact the lives of humans and other animals, plants, and the environment? What are the issues that biotechnology raises about the role of science and technology in society and ethical issues related to Biotechnology?

Prerequisites: BIO 326 & 327 Class size: 24

***This course fulfills additional laboratory experience (3 credits) & the communications skills requirement.**

Biology 465/665 Molecular Biology Lab (3 credits) S. Raina

001 Lec	T	11:00-11:55	011 LSC
002 Lab	T	12:30-4:30	206 LSC
003 Lab	W	12:45-4:45	206 LSC

Description: This laboratory course will teach basic experimental techniques including DNA isolation, restriction endonuclease cleavage of DNA, gene cloning, tissue culture techniques, construction of transgenic plants, gene expression analysis, and other techniques central to Molecular Biology. While learning basic techniques in recombinant DNA technology, students will learn to apply scientific method to address questions in molecular biology. ***This course fulfills the communications skills requirement.**

Prerequisites: BIO 326 & 327 Class size: 48

Biochemistry 475 General Biochemistry I (3 credits) Castañeda/Staff

MWF 9:30-10:25 001 LSC (Exams on Mondays 7-9 pm: 9/24, 10/22, 11/26)

Description: The molecular logic of life. Chemistry of water and the amino acids. Weak inter-atomic interactions. Amino acids and peptides. Primary, secondary, tertiary and quaternary structures of proteins. Protein function: enzyme mechanisms, kinetics and regulation. Flow of genetic information. DNA structure, replication, repair, recombination. RNA synthesis and processing. Protein synthesis and the genetic code. Recombinant DNA technology. Metabolic pathways of glycolysis and respiration, and application of thermodynamic principles to them.

Textbook: TBD

Prerequisites: CHE 325

Exams: Four per semester. Comprehensive final; no make-up exams given.

Class size: 200 Frequency of Offering: Each fall semester

Biology 475 Biochemistry Lab (4 credits) Hehny

MW 1:00-5:00 207 LSC

Description: Experiments on proteins, enzymes, fatty acids, nucleic acids which illustrate modern biochemical techniques applied to the chemistry of living cells. Among the techniques employed are: electrophoresis; amino acid sequence determination; gel filtration; thin layer chromatography; enzyme isolation; enzyme kinetics; spectrophotometric assays; preparative ultra-centrifugation; preparation and analysis of tissue fractions; sucrose gradient centrifugation; base composition of nucleic acids. Careful recording of data is emphasized. Data are analyzed and discussed in class.

Textbook: *Fundamental Laboratory Approaches for Biochemistry*, Ninfa & Ballonite, 2nd Edition, 2010, Fitzgerald Press.

Examinations: Lab quizzes and notebook

Class size: 24 Frequency of Offering: Each fall semester

Biology 490 Independent Study (1-6 credits) Faculty

Proposal form & permission of instructor required.

Biology 495 Distinction Thesis in Biology (1-3 credits) Faculty

Description: This course is for students preparing a thesis in partial fulfillment of the requirements for the Distinction in Biology Program. It normally will be taken by Distinction students in the semester prior to graduation. Proposal & permission required.

Biology 499 Honors Capstone Project (1-3 credits) Faculty

Description: Writing of an honors thesis by senior Biology majors. Proposal & permission required.

Biology 600-001/400-001 Sem: Epigenetics of Human Health & Disease (3 credits)
MacDonald

MW 3:45-5:05 214 LSC

Description: The epigenome encodes information above and beyond the sequence of DNA, acting at the interface between genes and the environment. This course will explore how epigenetic modifications influence our health and modify our risk of disease, including neurodevelopmental and neurodegenerative disorders, heart disease, and obesity. Seminar format including lectures, discussions, student presentations, and various writing assignments.

Prereqs: BIO 326 & 327; BIO 443 or 462 recommended.

Class size: 15

Biology 600/400-002 Sem: Isotopic Approaches in Global Change Ecology (3 credits)
Becklin

TTh 2:00-3:20 156 LSC

Description: Natural changes in atmospheric composition and climate have had major impacts on individual organisms and ecosystem functioning over geologic time. In addition to these natural changes, human activities have dramatically altered the functioning of current ecosystems, and this is only expected to increase into the future. For this course, we will discuss basic research addressing the effects of climate and atmospheric changes on both current and ancient ecosystems, with specific emphasis on studies that use stable isotope chemistry to evaluate ecological and physiological responses of biota. As part of this course, students will learn fundamental principles of isotope behavior and chemistry in natural systems, critically evaluate scientific studies that apply isotope chemistry to global change questions, and conduct authentic isotope research to learn basic methods of isotope sample preparation and data interpretation.

Class size: 15

Biology 600/400-010 Microbes in Biotechnology (3 credits) Phillips

TTh 2:00-3:20 106 LSC

Description: Microbes can do things you never imagined! They can treat disease, change your DNA, clean up human pollution, run on electricity and much, much more. This topics-driven course covers genetic, biochemical, molecular and biotechnological aspects of microbes. Readings are drawn primarily from current scientific literature devoted to the many applications of microbes (including bacteria, archaea, fungi and viruses) in multiple fields of biotechnology.

Biology 610 Graduate Research Laboratory (1-3 credits)
Faculty

Description: Work in research laboratories to acquire skills and techniques. May be repeated for a maximum of 6 credits. Offered every semester.

Biology 625 Methods in Neuroscience (0-3 credits) S. Hewett/R. Jones
TBA TBA TBA

Description: A practical interdisciplinary survey course whereby neuroscience faculty introduce students to a wide array of methodologies, including molecular, cellular, developmental, systems, behavioral, and cognitive neuroscientific approaches to investigate basic, pre-clinical, translational, and clinical questions to unravel the relationship between brain and behavior.

Class size: 5

Bio/Ben/Cen/Che/Phy 635 Physical Cell Biology (3 credits) Manning
TTh 11:00-12:30 414 Bowne

Description: This interdisciplinary course will emphasize current quantitative advances in cell biology and cover topics such as the structure and dynamics of cell membranes, the dynamics of the cytoskeleton and molecular motors, DNA replication and repair, genome packing, gene regulation, mechanical interactions between cells, and signaling pathways. The course will give biology and bioengineering students a more quantitative background for describing biological processes and give physics and chemistry students a strong introduction to biomolecules and cellular processes. The course will be offered every year in the Fall semester. It is open to all graduate students.

Biology 657457 Principles of Human Toxicology (3 credits) J. Hewett
MWF 9:30-10:25 011 LSC

Description: This course will examine the interactions between chemical, physical or biological substances and mammalian systems that result in adverse changes in physiological function. Concepts in chemistry, biochemistry, cell biology, and anatomy and physiology will be applied to the study of absorption, distribution, biometabolism and elimination of toxic agents, or poisons. In addition, general molecular mechanisms by which poisons act will be examined, including the processes of genotoxicity and carcinogenesis. Several general classes of poisonous agents, including pesticides, herbicides, and heavy metals, will be discussed in some detail. Finally, students will learn about important concepts in exposure risk assessment and the government agencies that regulate use of and exposure to chemicals in our food and environment. Additional work will be required of graduate students.

PREREQ: BIO 327, and CHE 275, and MAT 285

Textbook: Casarett & Doull's *Essentials of Toxicology*, 2nd Edition.

Biology 659/459 Plants & People (3 credits) Coleman

TTh 12:30-1:50 011 LSC

Description: Plants are critical for sustaining life on Earth. They sequester carbon dioxide and convert solar energy to forms that can be used, acting as key agents against climate change. In addition they are a key source of food, clothing and fuel. This course will focus on how plants function individually, and as they interact with their environment. The course goals are to gain an understanding of basic plant biology at the molecular level, to understand the role of plants in the environment and in society, and to use this information to make informed opinions and decisions about current environmental issues including air pollution, land conservation, climate change and genetic modification. As plants are a model system for molecular genetics, cell biology and biochemistry research, this class is an excellent elective for students interested in these areas.

Biology 663/463 Molecular Biotechnology (4 credits) S. Raina

001 Lec MWF 11:40-12:35 011 LSC
002 Lab Th 12:30-3:45 306 LSC

Description: Biotechnology I is the first course of a two-course Biotechnology series. The second course, Biotechnology II, will be offered in the spring. These courses complement each other, but one is not required for the other.

These courses will introduce students to the molecular and genetic principles and processes involved in biotechnology. Lectures will include topics such as the genetic modification of microbial, plant, & animal cells, forensic biotechnology, and important medical, industrial, agricultural and environmental applications of biotechnology. Labs will cover many of the methods routinely used in biotechnology labs.

This course will address questions such as: What is biotechnology, how is it done, and how is it being used today? How can biotechnology impact lives of humans and other animals, plants, and the environment? What are the issues that biotechnology raises about the role of science and technology in society and ethical issues related to Biotechnology?

Class size: 24

Biology 665/465 Molecular Biology Lab (3 credits) S. Raina

001 Lec T 11:00-11:55 011 LSC
002 Lab T 12:30-4:30 206 LSC
003 Lab W 12:45-4:45 206 LSC

Description: This laboratory course will teach basic experimental techniques including DNA isolation, restriction endonuclease cleavage of DNA, gene cloning, tissue culture techniques, construction of transgenic plants, gene expression analysis, and other techniques central to Molecular Biology. While learning basic techniques in recombinant DNA technology, students will learn to apply scientific method to address questions in molecular biology.

Class size: 48

Biology 688 Biological Literature (1-3 credits) Faculty

Description: Independent reading program carried out under the direction of a faculty member. Explicit permission must be obtained from a faculty member. Lectures and library problems designed to acquaint the student with current literature, techniques of searching scientific literature and preparation of reports using reference materials.

Prerequisites: Permission of instructor and submission of proposal

Biology 690 Independent Study (1-6 credits) Faculty

Description: This is a program of guided research, usually involving laboratory work.

Prerequisites: Since this course involves work done usually in faculty laboratories, arrangement must be made by the student with the faculty member who will supervise the research. The Proposal for Independent Study Courses must be made out, signed by the professor and taken to 110 LSC for department signature before registering. NOTE: This course should not be used for dissertation work.

Biology 700-001 ST: Plant Resource Dynamics (1-6 credits) Ritchie

M 8:30-9:20 100 LSC

Description: The ways that plants use their resources, such as carbon, water, nitrogen, phosphorus, has a huge impact on the form and function of plants in different environments, and on the dynamics of food webs and ecosystems. The evolution of plant physiology of photosynthesis, respiration and growth is set in the context of limiting supplies of resources, light and thermal energy, possibilities for benefits from resource exchange mutualists, and various risks, e.g., herbivory, climate extremes, disease, competition. This seminar-style course will explore these topics from an evolutionary and ecological perspective by reading recent literature and presenting syntheses.

Biology 700-002 ST: Seminar in Conservation Behavior (1-6 credits) Parks

TBA TBA TBA

Biology 705 Graduate Research Seminars (0-1 credit) TBA

T 3:30-5:00 106 LSC

Description: Students present their thesis or dissertation research and critically evaluate the research presentations of other students.

Frequency of offering: every semester

Biology 997 **Masters Thesis** (1-6 credits)
Biology 999 **Dissertation** (1-15 credits)
GRD 998 **Degree in Progress** (0 credit hours)

7/23/18