MB 505. Host-Associated Microbiomes. 4 Credits. (3 Lec, 1 Lab) F
PREREQUISITES: BIOC 160; CHMY 123; BCH 380; BIOM 360. This course will introduce students to the microbial ecosystems that colonize human and animal hosts, detailing their essential roles in host nutrition, health and development. Students will also be exposed to modern molecular techniques used to study these systems.

MB 515. Microbial Ecology. 3 Credits. (3 Lec) S alternate years, to be offered odd years.

MB 520. Microbial Physiology. 3 Credits. (3 Lec) F
PREREQUISITE: BIOM 360 and BCH 380. An in-depth examination of microbial cell structure and function, bioenergetics, and intermediary metabolism and control. Students will also be expected to consider biochemical function within the context of genomic sequences, and be able to formulate predictions for carbon and energy flow.

MB 525. Advanced Immunology. 3 Credits. (3 Lec) S alternate years, to be offered even years.
PREREQUISITE: BIOC 410. Recent advances in immunochemistry, immunogenetics, immunopathology, molecular and cellular immunology. Cross-listed with VTM 501.

MB 527. Toxicology. 3 Credits. (3 Lec) F
PREREQUISITES: CHMY 141 and CHMY 143 and BIOC 160. CO-REQUISITE: BCH 380. This course introduces mechanisms of toxicity; effects of toxicants on major organ systems. Major classes of toxicants: absorption, distribution, biotransformation and elimination of toxicants. Human exposure to drugs of abuse and environmental agents, case studies, and risk assessment are discussed. Co-convened with BIOM 425.

MB 528. Advanced Genetics. 3 Credits. (3 Lec) S alternate years, to be offered odd years.
PREREQUISITE: BIOM 450 or equivalent. Recent advances in microbial genetics with an emphasis on molecular genetics and eukaryotic gene expression.

MB 530. Virology. 3 Credits. (3 Lec) F
PREREQUISITES: BIOC 160 or BIOC 260 or BIOC 375 or BIOC 320 or BCH 380 or BCH 442 or BCH 444R or BCH 445. Fundamentals of virology with emphasis on animal viruses of medical importance. Molecular aspects of structure, replication, transmission and host response to viral infection will be covered.

MB 533. Current Topics in Microbiology for Teachers. 3 Credits. (1 Lec, 1 Lab, 1 Ret) S
PREREQUISITE: A minimum of two years science teaching experience. This course will provide an inquiry based examination of current microbiology related topics. Topics may vary from semester to semester and will be selected by the assessment of what is considered "newsworthy." Topics could include but not be limited to hospital acquired and community acquired infections, antibiotic resistance, immunizations, food safety and drinking water. Emphasis will be placed on the ramifications of issues with respect to industry, medicine, and personal health. A review of literature will provide background information for the topics in order to provide teachers sufficient and correct information to hold discussions regarding these topics in their classrooms.

MB 535. Genomic Analysis Lab. 4 Credits. (3 Lec, 1 Lab) F
PREREQUISITE: Permission of instructor needed. The quantity of sequence information deposited into databases necessitates that scientists train in both discovery and hypothesis-based research that utilizes these resources. This class will cover experimental design, database searching and management, sequence alignment, molecular pattern recognition, and phylogenetics.

MB 536. Exploring Microbiology. 3 Credits. (3 Lec) S
PREREQUISITE: BS in Biology or equivalent degree COREQUISITE: Graduate standing or petition approval from the Vice Provost of Graduate Education. Explore microbiology, prokaryotes, microbial eukaryotes, viruses, acellular agents, microbial evolution, diversity, by focusing on an experimental microcosm. Ideal for middle/high school/lower level college teachers and others in education and outreach roles, e.g., museums, zoos, National Parks, nature preserves, environmental health.

MB 537. Advance in Molecular Evol. 3 Credits. (3 Lec) F
PREREQUISITE: BIOM 410 or 450 or 453 or 528 or 538 or BIOL 402 or BCH 380 or BCH 441 or BIOB 475. The fundamental objectives of this course are to provide graduate students with a basic introduction to molecular evolution. The study of molecular evolution encompasses the origin and evolution of life on earth at the molecular level.

MB 538. Cell & Molecular Biol. 2 Credits. Su
PREREQUISITE: BIOM 360, BCH 380 or BIOL 402. MB 536, or the equivalent. COREQUISITE: Graduate standing or petition approval from the Vice Provost of Graduate Education. An inquiry-based laboratory in prokaryotic and eukaryotic C&M provides training in microbiological techniques: recombinant DNA, phylogenetic analyses, growth, cell cycle regulation, gene expression, protein purification, and immunoassays. Current literature and laboratory discussions cover molecular approaches for investigating complex cellular mechanisms.

MB 539. Infection and Immunity. 3 Credits. Su alternate years, to be offered even years.
PREREQUISITE: BIOM 410 or BIOM 435 or BIOM 431. COREQUISITE: Graduate standing or petition approval from the Vice Provost of Graduate Education. Infection and Immunity is a required course for the MSSE program.

MB 540. Environmental Microbiology. 3 Credits. (3 Ind) F
PREREQUISITE: MB 536 and MB 543 or equivalent course. COREQUISITE: BS in biology or equivalent; Graduate standing or petition approval from the Vice Provost of Graduate Education. Biotechnology, industrial microbiology, antimicrobial chemotherapy, public health, epidemiology, climate change, food water, wastewater, extreme environments, space travel, biodegradation, bioremediation and biosimulation. Ideal for middle/high school/college teachers, and others in education/outreach e.g., museums, zoos, National Parks, nature preserves, environmental health.

MB 541. Microbial Genetics. 3 Credits. (3 Lec) Su alternate years, to be offered odd years.
Prokaryotes provide much of the understanding of fundamental genetics for all organisms, especially through in vivo and in vitro genetic tools. Transcription, translation, mutation and recombination are considered, so that science teachers understand of fundamentals of genetics. This course is intended for practicing teachers and those in the MSSE program.

MB 542. Microbial Ecology. 3 Credits. (3 Lec) S
PREREQUISITE: MB 536 or equivalent course or BS in Biology. COREQUISITE: BS in biology or equivalent; Graduate standing or petition approval from the Vice Provost of Graduate Education. Ecology of microorganisms, their nutrition, growth, control, metabolism, biogeochemical cycling, natural environments, habitats and interactions. Centered on an experiment, this discovery-based course is ideal for middle/high school/lower level college teachers, and others in education/outreach roles, e.g., nature facilities, environmental health.

MB 544. Advanced Bioinformatics. 4 Credits. (3 Lec, 1 Lab) S alternate years to be offered on even years. This course will cover advanced topics in Bioinformatics, including genome assemblies and functional annotations of proteins. The course is meant to support experimental work by training students to make confident predictions from biological sequences and to develop testable hypotheses that will guide their experimental work. Students will learn about using local and worldwide prediction servers.

MB 547. Thermal Biology of YNP, 2 Credits. (1 Lec, 1 Lab) Su
Thermal Biology, an interdisciplinary science that incorporates biology, geology, and chemistry to discover where and under what conditions life can exist in the thermal features of Yellowstone National Park. As such, it lends itself easily to incorporation to most science curricula. The two goals of this are to: 1) provide a basic understanding of the ecology of a variety of life forms and their thermal habitats, and 2) provide a survey of observational techniques and hands-on activities appropriate for science educators.

MB 552. Adv Soil & Env Microbiology. 3 Credits. (3 Lec) S alternate years, to be offered even years.
PREREQUISITE: BIOM 452 or consent of instructor. Advanced laboratory course. Microorganisms are targeted for isolation and characterization, emphasizing those not normally encountered in general microbiology laboratory. Biochemical cycling, contaminant biodegradation, extremophiles, and plant-microbe interactions are typical topics is investigated. Students employ classic and novel cultivation approaches, identifying microbes based morphology, physiology, and phylogeny. Cross-listed with LRES 552.
MB 560. Infectious Disease Ecology & Spillover. 3 Credits. (3 Lec) F
PREREQUISITES: Background in Microbiology, Immunology, Ecology; by
consent of instructor. Disease Ecology is highly interdisciplinary and merges
courses from microbiology, immunology, ecology, evolution, mathematics,
epidemiology, medicine, veterinary medicine, and geography. Thus this discipline
is positioned to address major global health issues. Students will study questions
such as: What factors, across molecular to landscape scales, must align to allow
pathogens to jump from animals to humans? Why is monkeypox spillover
increasing in West Africa as immunity to smallpox wanes? Why do wolves
experience periodic outbreaks of distemper in Yellowstone? Why did Ebola
recently spread through multiple West African countries, whereas previous
outbreaks were restricted to small regions in Central Africa?

MB 575. Professional Paper. 1-4 Credits. (1-4 Ind; 6 cr max)
PREREQUISITE: Graduate standing and committee approval. A research or
professional paper or project dealing with a topic in the field. The topic must have
been mutually agreed upon by the student and his or her major adviser and graduate
committee.

MB 589. Graduate Consultation. 1-3 Credits. (1-3 Ind) F,S,Su
PREREQUISITE: Master's standing and approval of the Dean of Graduate
Studies. This course may be used only by students who have completed all of their
coursework (and thesis, if on a thesis plan) but who need additional faculty or staff
time or help.

MB 590. Master's Thesis. 1-10 Credits. (3 Ind; 20 cr max) F,S,Su
PREREQUISITE: Master's standing.

MB 591. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand
PREREQUISITE: Upper division courses and others as determined for each
offering. Courses not required in any curriculum for which there is a particular one
time need, or given on a trial basis to determine acceptability and demand before
requesting a regular course number.

MB 592. Independent Study. 1-3 Credits. (1 Ind; 6 cr max) On Demand
PREREQUISITE: Graduate standing, consent of instructor, approval of department
head and Dean of Graduate Studies. Directed research and study on an individual
basis.

MB 594. Seminar. 1 Credit. (1 Sem; 4 cr max) F,S
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites
as determined for each offering. Topics offered at the graduate level which are
not covered in regular courses. Students participate in preparing and presenting
discussion material. There are separate sections for departmental seminar, general/
environmental and biomedical microbiology journal clubs and graduate reading;
consult the.

MB 598. Internship. 2-12 Credits. (2 Ind; max unlimited)
PREREQUISITE: Graduate standing, consent of instructor and approval of
department head. An individualized assignment arranged with an agency, business
or other organization to provide guided experience in the field.

MB 690. Doctoral Thesis. 1-10 Credits. (3 Ind; 30 cr max) F,S,Su
PREREQUISITE: Doctoral standing.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.