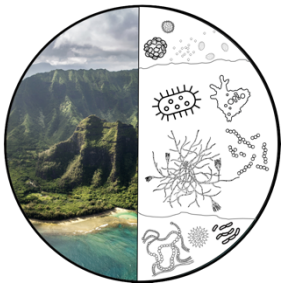
MICROBES AND THEIR ENVIRONMENT
MICRO 485
LECTURE

Instructor: Nhu Nguyen
Office: Sherman 221
Office hours: by appointment
Email: nhu.nguyen@hawaii.edu
Telephone: 808-956-6593



Instructor: Marek Kirs
Office: Holmes 281
Office hours: by appointment
Email: kirs@hawaii.edu
Telephone: 808-956-8272

Lecture: MWF 11:30-12:20 PM
Location: St. John 11
Prerequisites: BIOL 171 and CHEM 272, or consent

Course description: Microbes are everywhere! They're in the air you breathe, in the soil you walk on, and in the water you swim. In this class, we will explore their tremendous diversity and learn how these tiny organisms have the power to change their local environments and the whole planet. In this class, we will use a multidisciplinary and integrative approach to understanding of the continuum of life microbial life: viruses, bacteria, archaea, fungi and protists. We will learn how they function alone, in context of each other, with their hosts, and together how they cause huge changes in both natural and human-influenced environments.

Course structure: The course consists of 3 hours/week lectures. There are 4 exams in total where each exam counts for 20% of your grade. Exams will assess your various thinking skills with multiple choice, short answers, true/false, fill in the blanks, matching, and short essays. There will be class discussions and case studies integrated into the lectures. The final project & presentation will be worth 20% of your grade.

Course objectives:
1. Acquire depth and breadth of knowledge about the biology of diverse groups of microorganisms that dwell in various environments, the roles that they play in manipulation of essential ecosystem processes, and how they contribute to overall environmental health.
2. Integrate important principles as well as methodologies from various disciplines within life sciences such as ecology, evolution, biochemistry, organismal biology, and genetics to explain microbial processes.
3. Analyze and contextualize the potentials of microorganisms and how they contribute as well as damage natural environments, affect human society, and affect the overall future health of the planet.
4. Develop solutions using microbiology to solve impending societal and environmental issues.
5. Demonstrate skills in speaking, listening, questioning, and leadership.

Student learning objectives:
1. Demonstrate understanding of microbiology from genes to ecosystems and how it is fundamental to environmental health.
2. Demonstrate the ability to identify problems and develop solutions using the fundamental principles associated with microbiology to solve agricultural and environmental issues.
3. Demonstrate proficiency in oral communication and leadership through group discussions and general classroom participation.

Textbook: Not required.

Makeups: Exams and quizzes may be made up but only with university accepted documents. It is at the discretion of the instructor to determine acceptable reasons for makeups outside of accepted documents. You must make prior arrangements if you know you will miss a class. It is up to the student to arrange a makeup with the instructor. Makeups must be taken prior to the next exam or quiz.

Academic integrity:
Cheating will result in a 0 score for exams and quizzes, and will result in disciplinary action. We will adhere strictly to UH Manoa's policies on academic integrity at http://www.catalog.hawaii.edu/about-uh/campus-policies1.htm

Grading components:

Exams (4)	80%
Final Presentation	20%
Total	100%

Letter Grade Assignment:
A+= 97-100, A= 93-96, A- = 90-92
B+ = 87-89, B = 84-86, B- = 80-83
C+= 77-79, C = 74-76, C- = 70-73
D+ = 67-69, D = 64-66, D- = 60-63
F = <60

Date	Lecture #	Module	Instructor	
January 7	1		Nguyen/Kirs	First day of instructions
January 9	2	Microbial Diversity	Nguyen	Microbial Diversity; Bacteria & Archaea
January 11	3	Microbial Diversity	Nguyen	Bacteria & Archaea
January 14	4	Microbial Diversity	Nguyen	Bacteria & Archaea
January 16	5	Microbial Diversity	Nguyen	Cyanobacteria & Algae
January 18	6	Microbial Diversity	Nguyen	Cyanobacteria & Algae
January 21				**Martin Luther King Jr. Day (No class)**
January 23	7	Microbial Diversity	Nguyen	Fungi & Oomycetes
January 25	8	Microbial Diversity	Nguyen	Fungi & Oomycetes
January 28	9	Microbial Diversity	Nguyen	Fungi & Oomycetes
January 30	10		Nguyen	**EXAM 1**
February 1	11	Biogeochemical Cycles	Kirs	Biosphere
February 4	12	Biogeochemical Cycles	Kirs	Carbon Cycle
February 6	13	Biogeochemical Cycles	Kirs	Carbon Cycle, Nitrogen Cycle
February 8	14	Biogeochemical Cycles	Kirs	Nitrogen Cycle
February 11	15	Biogeochemical Cycles	Kirs	Phosphate Cycle
February 13	16	Biogeochemical Cycles	Kirs	Sulphur Cycle
February 15	17	Biogeochemical Cycles	Kirs	Iron & other metals
February 18				**President's Day (No class)**
February 20	18	Biogeochemical Cycles	Kirs	Case studies
February 22	19	Biogeochemical Cycles	Kirs	**EXAM 2**
February 25	20	Aquatic Environments	Kirs	Water & Microbes
February 27	21	Aquatic Environments	Kirs	Freshwater Environments (Surface Water)
March 1	22	Aquatic Environments	Kirs	Freshwater Environments (Groundwater)
March 4	23	Aquatic Environments	Kirs	Salt water Environments (Seas & Oceans)
March 6	24	Aquatic Environments	Kirs	Pollution of Aquatic Systems
March 8	25	Aquatic Environments	Kirs	Waterborne Pathogens, Disease Transmission and Global Change
March 11	26	Aquatic Environments	Kirs	Water Quality Regulations, Epidemiological Studies, QMRA.
March 13	27	Aquatic Environments	Kirs	Wastewater Treatment & Disinfection
March 15	28	Aquatic Environments	Kirs	Drinking Water Treatment & Disinfection
March 18				**Spring Recess (No class)**
March 20				**Spring Recess (No class)**
March 22				**Spring Recess (No class)**
March 25	29	Aquatic Environments	Kirs	Methods in Water Microbiology
March 27	30	Aquatic Environments	Kirs	**EXAM 3**
March 29	31	Terrestrial Environments	Nguyen	Soils & Microbes; Soil Ecology
April 1	32		Nguyen	CTAHR Symposium
April 3	33	Terrestrial Environments	Dhungana	The Rhizosphere
April 5	34	Terrestrial Environments	Heisey	The Rhizosphere
April 8	35	Terrestrial Environments	Nguyen	The Rhizosphere
April 10	36	Terrestrial Environments	Nguyen	Pathogens in soils
April 15	37	Terrestrial Environments	Nguyen	Carbon & Global Change
April 17	38	Terrestrial Environments	Nguyen	Carbon & Global Change
April 19				**Good Friday (No class)**
April 22	39	Terrestrial Environments	Nguyen	Xenobiotic compounds
April 24	40	Terrestrial Environments	Nguyen	Bioremediation
April 26	41		Nguyen/Kirs	Student Presentations
April 29	42		Nguyen/Kirs	Student Presentations
May1	43		Nguyen/Kirs	Student Presentations
May 6-10			Nguyen/Kirs	**EXAM 4**